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Receiver Appointed for Great Lakes Paper Co.

National Trust Co., Will Act As Manager and Receiver On Behalf of All Holders of First Mortgage Bonds—F. R. McKelcan States Primary Object of Move Is to Improve Business Outlook for Company and to Ensure Fulfillment of Contracts—Protective Committee Formed, Headed by Right Hon. Arthur Meighen, K. C.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., July 20, 1931.—The Great Lakes Paper Company, Ltd., with mill at Fort William, Ont., went into a receivership in Toronto on July 14, and, by order of Justice Sedgewick, the National Trust Company was appointed receiver and manager on behalf of all holders of first-mortgage bonds of the undertaking and property of the company. The application for a receivership followed the failure of the paper company to pay the half-yearly installment of interest due March 1 last on its $10,000,000 first mortgage bond. The application was brought by the Trust Company as trustee for the bondholders. Hopes have been entertained that earlier interest payment might be possible but such was not the case.

Trust Co. Issues Statement

The following statement was given to the press by F. R. McKelcan, K. C., of the National Trust Company: "As appears from my affidavit filed in today's proceedings, our primary objective in putting the Great Lakes Paper Company into receivership is to improve the business outlook for the future. As matters stood before the receivership, publishers might well hesitate to make contracts with the Great Lakes Paper Company for fear that action might be taken on behalf of the bondholders or creditors which would render their contracts ineffective.

"This situation could not have been met by the mere payment of bond interest in arrears, as this would still have left customers open to the risk of the company being prevented from carrying out its contract in the event of failure to meet future bond interest or other creditors' claims which might result in proceedings being taken against the company. It was found impossible at this time to meet these requirements of the situation. All difficulty in satisfying customers as to the effectiveness of any contracts made by them should now be entirely removed, as such contracts will be made with us as receivers and managers of the Great Lakes Company, and under our law, such contracts in effect rank in priority to the claims of the bondholders and creditors."

Protective Committee Formed

Announcement was also made of the formation of a protective committee to act in the interest of holders of the first mortgage bonds of the company. The committee will consist of the Right Hon. Arthur Meighen, K. C., who will act as chairman; A. D. Cobban, of Wood-Gundy & Co., Ltd., J. H. Ratcliffe, of McLeod, Young & Weir Company, Ltd., and R. P. Matthiessen, of Minneapolis, representing the United States banking interests connected with the original offering of bonds. The National Trust Company, Ltd., trustees for the bondholders, will act as depositor for the first mortgage bonds, with co-depositories in the United States. E. G. Long, K. C., of Toronto, will act as counsel for the committee.

Although no formal proceedings had been taken until yesterday, it is stated that the National Trust Company has been in close touch with the situation with a view to protecting the interests of the bondholders since interest was defaulted on March 1 last. The receivership proceedings were taken with the consent of the company. In order to permit of full cooperation between bondholders and the National Trust Company it has been deemed advisable to form a committee of bondholders. It is understood that formal notification will be forwarded to bondholders in due course, and that deposit of bond will be requested.

Incorporated in Ontario

The Great Lakes Paper Company, Ltd, is incorporated under the laws of the Province of Ontario. The head office of the company is in Minneapolis, Minn., and the mill at Fort William, Ont. E. W. Backus, of Minneapolis, is president of the company. The capacity of the woodpulp mill is stated to be more than sufficient to furnish all the requirements of the news print paper mill. In addition, the company has built docks for shipments, via the Great Lakes, and the railway and plant terminals. The company holds, under agreement with the Province of Ontario, valuable timber and pulpwood limits accessible to its mills, sufficient to supply mills with 200,000 tons annual capacity for more than fifty years.

New Company to be Formed

A late development of the Great Lakes Paper Company affair is the intimation that immediate application is to be made to the department of the Provincial Secretary at Queen's Park for the incorporation of a new company to succeed the Great Lakes organization, this week turned over to the National Trust Company. It is under-

(Continued on page 22)

Philadelphia Paper Market Shows Steady Trend

Broader Inquiries for Standard Grades of Paper Being Received By Distributors, Indicating Improvement of Substantial Quality In Near Future—Kraft Wrapping Paper Situation Better—Offerings of Better Grades of Paper Stock Limited

PHILADELPHIA, Pa., July 20, 1931.—Though present conditions are not as encouraging as local distributors desire, there is evidence that the future holds out hopes of improvement of substantial quality. Distributors report that consumers who have not been in the market for a year or more on a broad scale are now beginning to shop around for prices and have submitted to the dealers orders that may be placed at an early date. Another factor taken into consideration for the coming improvement is advancing prices which have a usefulness at this time in promoting sales owing to their impression on the consumers of the trend of values upward.

Prices on krafts have been generally advanced, Distributors are fairly well cleared up at the old low values of the early year. If the present advance holds, dealers state, there will be stimulation of buying before Fall. Dealers state consumers are low in stocks and few have any grades on hand in quantities. Bags, too, have been advanced. Sulphite tissues for wrapping purposes, however, have been lowered 5 per cent, but this is believed due to the duller seasonal demand and prices may soon be returned to the quotations of the past six months.

Ebon Hughes Holds Strathmore Conferences

Ebon Hughes, assistant sales manager of the Strathmore Paper Company, West Springfield, Mass., has been in the Philadelphia trade during the past week holding conferences with the distributors on the campaign to be started in August for sales of the Bay Path Cover papers in the Strathmore lines. The distributors with whom he conferred represent the local paper houses, The Paper House of Pennsylvania, Charles Beck Paper Company and the firm of A. Hartung, Inc. Another distributor of the Strathmore papers in the announcement and social stationery lines is the Raymond & McNutt Company, Sheridan Building.

F. I. Brower Wins Paper and Twine Golf Cup

In the Golfing Tournament held at the outing of the Philadelphia Paper and Twine Merchants' Association on the Baederwood Country Club, the annual cup award was won by Frederic I. Brower, manager of the Groveton Paper Company, Philadelphia office. There were 25 members and their ten guests joining in the annual outing and its program of sports and who rallied round the dining table at the luncheon and dinner served in the Club House. The Schuylkill Paper Company Silver Golf Cup which annually is awarded the winner of the low gross score and which was won by Mr. Brower, must be won three years successively before it can be permanently held by the winner. This year's other golf cup winner was Butler Smythe, J. L. N. Smythe Company, for low net score while George K. Hooper, of the Hooper Paper and Twine Company, was awarded the tennis prize, and David Greenaway, Quaker City representative of the Hanover Cordage Company the invitation prize. James Andrews, Schuylkill Paper Company captured the quoit throwing prize as champion for the 1931 season. A word of greeting was extended to the members and guests by the president of the association, William Edkin, of the Keystone Cordage Company.

Record Fly Paper Sales

R. E. Tongue & Bros., Inc., Allegheny and Amber streets, has acquired a national distribution for its Araba Fly Ribbons which this year attained a record of sales amounting to 15,000,000 for this season. The firm is sole United States and Mexico representative for the Araba fly papers which come in rolls. The fly paper rolls are imported.

N. A. Considine Tours New England Mills

Norbert A. Considine, head of the Paper House of Pennsylvania, left last week for a tour of the New England paper mills and a stop over at the mills of the Strathmore Paper Company in West Springfield, Mass., where he will remain for several days.

George W. Ward Honored

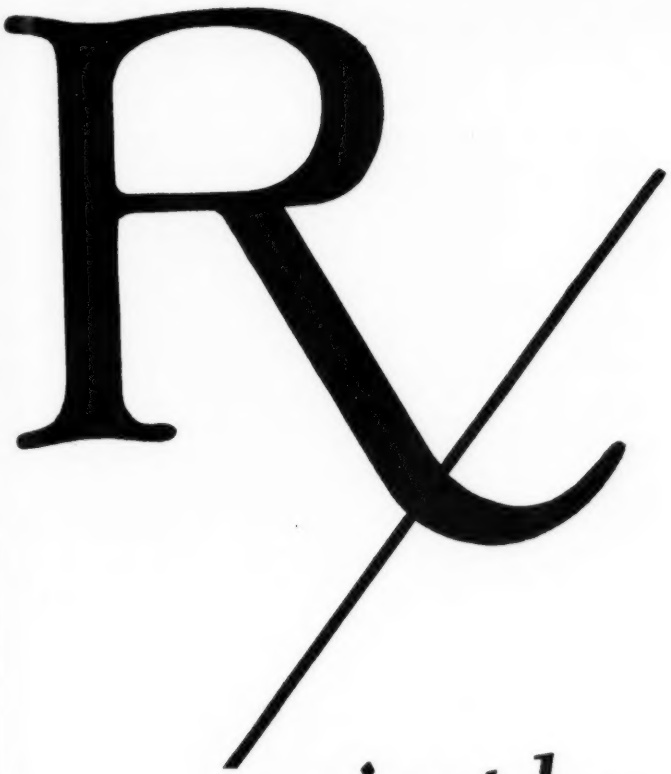
George W. Ward, head of the D. L. Ward Company, Terminal Commerce Building, was elected chairman of the Direct Mail Committee of the Poor Richard Club, an office he has held for several years, and which he has successfully filled as prime mover in all matters connected with this branch of the graphic arts in the Quaker City and in his affiliation with the National Direct Mail Association. It was through his efforts that the Direct Mail Leaders Exhibit was founded and made a matter of annual awarding of prizes for the fifty best specimens of direct mail campaigns conducted by various concerns throughout each year. These exhibits were formerly permanently displayed at the Ward Company's headquarters but are now circulated throughout the country through advertising men's clubs under the auspices of the National Association of Direct Mail Users.

Henry Hudson Huequenele At His Desk Again

Henry Hudson Huequenele, secretary of the Huff Paper Company, Terminal Commerce Warehouse Building, Delaware Avenue and Spring Garden street, who has been confined to the hospital for some time under observation, is now entirely recovered and is again at his desk after spending a few weeks at home recuperating.

Paper Trade Bowling League Victors

The awards to the victors in the recent games played throughout the winter and spring months by the paper trade associates enrolled in the Paper Trade Bowling League and played on the Recreation Alleys at 9th and Market streets were made in the form of cash to the winning team of the Whiting Paper Company, Philadelphia Branch, 619 Chestnut street. The checks received were the Team Prize of $25 and the individual prize of $10. The winner of the highest single score was James Lyon, captain of the Whiting Paper Company team, who rolled 234. The winner of the first half of the series of bowling matches played last winter was the Garrett-Buchanan Company, while the Whiting Paper Company won the second half of the series. In the finals these teams were matched for the championship of the 1931-1932 season, the Whiting paper Company capturing the laurels.



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4965

Paper Demand Gradually Expanding In Boston

Despite Seasonal Dullness, Local Paper Market Is Exhibiting Strong Undertone, Due to General Improvement Experienced In New England Business Conditions—Fine Paper Organizations and Manufacturers Representatives Anticipate Further Betterment

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 20, 1931.—With general conditions in New England continuing to improve, slowly, but steadily, the paper industry is more active, in spite of the seasonal dullness. "Business generally is better," comments a paper dealer, in discussing the situation. He notes, in connection with his sales, that June was better than May, that July had started off well and was holding the rate so far. Fine paper houses and manufacturers' representatives as a whole are looking forward to still further improvement. Advertisers who use the direct mail method, particularly those in the department stores, are making special efforts to win trade, bringing about a greater consumption of paper.

Demand Is Seasonable

The demand for paper and cardboard for calendars, usually current at this season, is fully up to that which has prevailed for the last few years. The call for kraft is holding its own, with dealers optimistic. The glassine market is spotty, although in some quarters, at least, production is at capacity. The box board market is sustaining the same volume of recent weeks, although some box manufacturers have shut down their plants for vacations and repairs to machinery. Greater activity in the shoe industry continues, with a good demand for material for cartons.

There is little or no demand for paper stock. Dealers say the market is very weak, with indications that it will remain so for from four to six weeks. Domestic manila rope is particularly slack, and has declined from 2.25 to 2.00.

William W. Jenks Resigns

William W. Jenks, former president of Stimpson & Co., Inc., has resigned that office after 52 years of active service with the corporation. Mr. Jenks, though maintaining his financial interest in the company, has taken this step to give the younger members of the firm the opportunity to conduct the business.

Willard H. Loud, former treasurer, is now president and general manager of the corporation and Mr. Jenks acting assistant manager. Mr. Loud is well known in the trade, having been in the paper business 29 years, fifteen of which he was in active managership of Stimpson & Co. Warren L. Chace, previously sales manager, is now treasurer.

Before coming to Stimpson & Co. Mr. Chace was with the United States Envelope Company and has been in the envelope and paper industry about fourteen years. He has had considerable experience in sales work. The other officers remain as before, with Alfred L. Gooch as vice president and Arthur M. Bartlett as secretary.

Stimpson & Co., a firm well known throughout New England, was established in 1856. It was primarily a coarse paper house, but in recent years has developed a very substantial business in fine paper as well.

News of the Trade

The Arnold-Roberts Company has taken on the Sulgrave lines, manufactured by the Standard Paper Company, Richmond, Va. They include Sulgrave Cover, of a beautiful antique finish; Sulgrave Plate Finish, a paper for book work, and a laid antique paper with a range of attractive colors. The firm has just added another of the A. M. Collins (Philadelphia) papers, Parchmentone Translucent Cover, which harmonizes with Parchmentone Book Paper. It is a duplex sheet, of a very pleasing color range and pattern. The company is putting into stock Ticonderoga Text, made by the Ticonderoga Pulp and Paper Company, Ticonderoga, N. Y. This paper is a laid antique sheet, deckle-edge, in a variety of attractive colors. It is also obtainable in envelopes. The Arnold-Roberts Company has prepared sample books and dummies of these lines.

Henry L. Goodman is showing samples of new gold and aluminum folding box boards, made by the New York-New England Company. The Marvellum Company, of Holyoke, Mass., has just issued four new sample books of very attractive box papers, and the A. M. Collins Company is just putting on the market a fine line of trademarked, coated papers, all of which Mr. Goodman is handling.

Massey & Wendell, Inc., mailed to the trade last week new sample swatches of daily sales index which are manufactured by the Chemical Paper Mfg. Company, Holyoke, Mass.

The Deerfield Glassine Company, Monroe Bridge, Mass., is operating full time on the two machines, with considerable work ahead on orders to be filled.

T. M. Dix, vice president of the Spaulding & Tewksbury Company, is passing his vacation at Moultonboro, N. H., with Mrs. Dix and their daughter. L. B. Tewksbury, second vice president of the firm, has returned from a motor trip to New York State, including the Catskills, accompanied by his family.

Edward Wallin, credit manager of the Arnold-Roberts Company, is passing a few weeks' vacation at Cape Cod, Mass.

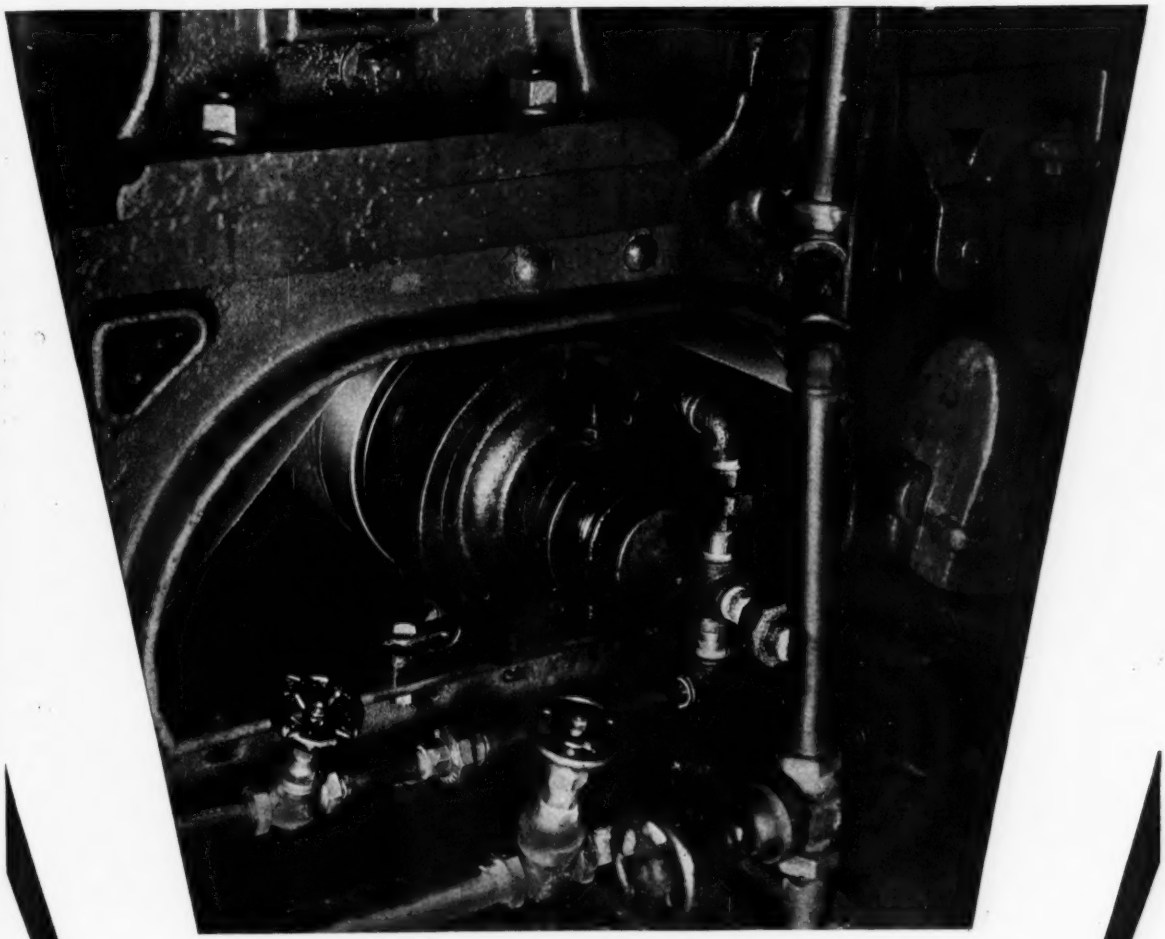
Frederick V. Carmer, of the Poinier-Carmer Company, who was confined to the house a few weeks on account of a broken ankle, is able to return to his office sooner than expected.

"You Never Know When Business Turns" is the leading article in the July "How," published by the Tileston & Hollingsworth Company and edited by A. V. Howland. The issue, which contains an analysis of the July sheet of the Tileston & Hollingsworth Calendar, is printed on Flemish Wove, white, with Milton Cover, white.

The Stone Envelope Company, Bridgewater, Mass., has been incorporated to deal in paper products. The capitalization is $10,000; 1,000 common shares, $10 each. The president is Leo Stone; vice president, George Stone, treasurer, Harry A. Stone, 281 Spring street, Brockton, Mass., and secretary Abe B. Tisch.

Edgar Smalley, managing director of Edwin Butterworth & Co., Ltd., Manchester, England, is expected in Boston the latter part of this month. He will be in the United States a fortnight and will visit the office of E. Butterworth & Co., Inc.

DOWNINGTOWN



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Canadian News Print Favored by Australia

New Preferential Trade Agreement Between Commonwealth and Dominion Places Canadian News Print Paper On Free List, Instead of Recently Inflicted Duty of $5 Per Ton—Preference Over Foreign Paper Will, Therefore, Be Approximately $20 Per Ton

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., July 20, 1931.—Paper manufacturers are highly pleased with the advantages accorded them in the new preferential trade agreement between Canada and Australia. This agreement extends to Canada the British preferential rates on 415 out of the 433 items in the Australian tariff schedule and gives Canada an opportunity of competing on the most favorable terms in a potential market of $630,000,000, of which some $300,000,000 has heretofore been purchased from countries outside the British Empire.

The most important advantage to the industry is that Canadian news print is now placed on the free list in Australia, instead of having to pay a duty of $5 a ton. The preference over foreign paper will therefore be £4 per ton, about $20. Preference is also granted on various classes of stationery and paper products, exceptions in the paper class being as follows: Wrapping, of all colors, (glazed, unglazed or millglazed), browns, caps not elsewhere specified, casings, sealings, nature or ochre browns, sulphites, sugars, and all other bag papers, candle carton paper; paper felt and carpet felt paper irrespective of weight. To the above-mentioned the general tariff will still apply.

Potential Market for Paper

Showing the potential market for the classes of paper to which preference is given, the forthcoming figures indicate Australia's purchases in 1930: News print, wrapping, etc., $25,174,178; stationery and paper manufacturers, $13,325,730; total, $38, 499,908. In allied class is a preference of two shillings per 100 board feet on many classes of lumber.

Last year the value of the year's exports of news print and general paper products to Australia amounted to approximately $5,000,000. The tonnage of news print shipped to Australia last year from British Columbia was 52,006 tons, having increased steadily in recent years from a little over 12,000 tons in 1925.

Actually Canada is now regarded as being on a better footing than Great Britain in many lines because of the advantage of distance. A rough computation would indicate that from Vancouver to Sydney the distance is only 6,800 miles as against 10,000 miles from London to Sydney via the Suez Canal, which is the shortest route from Great Britain. From Montreal to Sydney the distance is also about 10,000 miles while from Liverpool if ships were to travel via the Cape, would be nearly 13,000 miles.

In regard to those products on which duty is collected there is an important change. Formerly the Australian duty was collected on the cost of production plus the inland freight from point of origin to port of export. That is, the goods made in, say, Toronto for Australia, had duty collected on the cost, plus freight from Toronto to Vancouver or any other port where shipments were made to the Antipodes. Now the freight added for duty purposes is from point of origin to nearest outport, or from Toronto to Niagara Falls, though the goods are shipped over Canadian railways to Vancouver, Halifax or Montreal.

In connection with these concessions to the Canadian paper industry it should not be overlooked that Australia is still looking forward to the time when it will manufacture much of its paper requirements. The Assistant Minister for Industry of the Government of the Commonwealth of Australia, E. J. Holloway, recently presented to the House of Representatives, at Canberra, a report concerning the paper industry of Australia. The report was signed by I. H. Boas, chief of the Forest Products Division of the Australian Council for Scientific and Industrial Research, and also by H. W. Gepp, consultant on development to the Commonwealth Government. The report stated that a strong case existed in favour of the inauguration, at an early date, of a paper-pulp and paper-manufacturing industry in Australia, based mainly on the resources of hardwood timbers in Tasmania.

It was concerning that complete information should be obtained concerning the cost of erection of the proposed plants at Burnie and Kermandie in Tasmania, and that detailed forest surveys should be carried out. It was further pointed out, in the report, that it had been demonstrated that Australian eucalyptus hardwoods could be used commercially for the manufacture of certain types and qualities of paper.

About 40,000 tons of writing papers are imported into Australia annually and, of this quantity, it was urged that at least 25,000 tons could be produced within the Commonwealth from Australian raw materials. Furthermore, Australia utilises annually some 135,000 tons of news print paper, and the evidence pointed to the fact that the whole of this could be manufactured from Australian timber. It was recommended, in the report, that the Commonwealth and Tasmanian Governments should render all possible assistance to enable the industry to be established.

Outlook Promising for Canada Power Plant

The Hon. Charles A. Dunning, chairman of the Security Protective Committee of the Canada Power and Paper Corporation, has announced that the time limit for turning in securities in connection with the reorganization plans of the committee has been extended from July 15 to August 10. This has been done because the security holders are scattered over a wide area in both Canada and the United States and also on the other side of the Atlantic.

"The outlook," he said, "is most promising for the adoption of the plan of reorganization and its success is practically assured."

It is expected that in the course of the next few days the committee will announce the name of an outstanding executive as president who will be supported by a strong board of directors. Mr. Dunning said that naturally those whom the committee would like to see go on the board have to be consulted and have to have an opportunity of looking at matters for themselves before permitting their names to be made public.

Deposits of securities with the Securities Protective Committee now total over $51,500,000 par value, together with the majority of the common shares of the Corpora-

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The superior finishing qualities of Perkins Calender Rolls are the natural result of the longest and broadest experience in this highly specialized field of manufacture.

Perkins roll shop is the largest in the world.

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Perkins refills and remakes include the rolls of any manufacture, domestic or foreign, for any application in the paper industry.

B. F. Perkins & Son, Inc., Holyoke, Mass.

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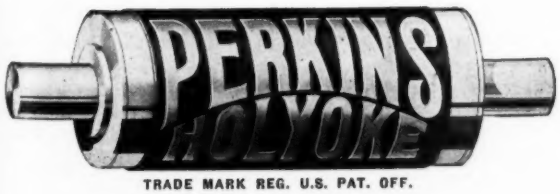

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Paper Rolls	Friction Calenders	Tensile Testers
Embossing Rolls	Embossing Calenders	Ventilating Fans
Chilled Iron Rolls	Sheet Calenders	Rag Cutters
Granite Press Rolls	Platers	Stock Cutters
Glassine		Paper Dampeners
Supercalenders		Bleach Ejectors

tion. Over 4000 individuals have now deposited their holdings with the committee.

It would now seem that the plan adopted by the committee has the support of the security holders, both large and small. Large companies such as the Canadian Pacific Railway, the Sun Life Assurance Company of Canada, the Great West Life Assurance Company, the Canada Life Assurance Company, The Mutual Life Assurance Company of Canada, Dominion Life, and the Manufacturers' Life Assurance Company are giving their support in a practical way by the deposit of their securities, it is stated.

Bierman's Still Opposes Plan

As against the above, Hubert Biermans, former president of Belgo Canadian Paper Company, Limited, claims that the Canada Power Securities Protective Committee have not got the necessary majority of 66 2-3 per cent of Belgo bonds to include Belgo in the plan. Mr. Biermans sailed for Europe on Saturday. In the event of the property falling back into the hands of the bondholders, he announced his intention before sailing of definitely drawing up the conditions of the eventual taking up and reorganization of Belgo and making the necessary financial arrangements before he returns to Canada in September.

"Of course," he said, "the committee of the Canada Power and Paper Corporation will make every effort possible to induce holders to deposit their securities in the name of that committee, claiming that Mr. Biermans will not be able financially to complete his plan of reorganization of Belgo alone.

"I can only repeat here what I have previously declared —that the Belgo security holders have been unjustly treated by the committee of the Canada Power and Paper Corporation, and that it is necessary for the bondholders to take steps to protect their own interests, and the only way to save their investments would be to take up the property through action by the bondholders.

"By depositing the securities in the name of the committee of Canada Power and Paper Corporation, the holders of Belgo bonds are forfeiting their exclusive rights to one of the best industries in the province, and will receive in exchange securities affecting properties of a much lower value, and mortgaged to the extent of an exaggerated ratio—without receiving any compensation whatever for the enormous difference in value represented by the above items between Belgo and the other subsidiaries together.

"Moreover, the committee of Canada Power has been unable to positively and finally declare that their connection with Anglo Canadian Pulp and Paper Mills has been definitely severed, both commercially and as far as operating is concerned.

"Although the committee has announced that Anglo-Canadian Pulp and Paper Mills, Limited, have been left out of their reorganization plan, it does not mean by any means that their mutual obligations are void.

"It has been demonstrated that the arrangement between Anglo and Canada Power and Paper has been a ruinous one for Canada Power, and if this situation persists the Canada Power is surely headed for bankruptcy."

In the absence of Mr. Biermans, John Stadler, president of the committee for the Protection of the Holders of Belgo Preferred Shares, will take care of the interests of the bondholders.

Bathurst Turns to Other Products

The new kraft lines and board units of the Bathurst Power and Paper Company are expected to be completed by the beginning of August. Expansion in this division represents an effort to offset the effect of low prices for kraft pulp. The company's kraft mill has a productive capacity of 75 tons of pulp a day, but operations of this unit were sharply curtailed last year.

This was due to lack of demand together with a smaller margin of profit existing on kraft pulp sales. Accordingly the management decided some months ago to manufacture the finished product and the necessary alterations to plant are now nearing completion.

In addition to a drastic curtailment in its sulphite and kraft pulp output in 1930, the company's production of news print for the year was approximately 61 per cent of capacity. The two news print machines were capable of turning out 140 tons a day; one of these machines has been converted for the manufacture of kraft container board.

Safety Board for Pulp Industry

Meeting at the Pulp and Paper Research Institute in Montreal representatives of the pulp and paper industry in the province of Quebec have taken preliminary steps toward the formation of a "Safety Association."

The proposed association will work under and in conjunction with the Workmen's Compensation Commission and will be formed somewhat on the lines of the safety association operated by the pulp and paper companies in Ontario. Accident statistics will be carefully recorded and every effort made to keep down the average as low as possible. The committee in charge will be formed of representatives of the various companies in the province.

World Shortage of Pulp Stocks

Lawrence W. Killam, president of the British Columbia Pulp and Paper Company, in an interview in Vancouver, said Japan was the only country in the world with a surplus of pulp stocks.

"In the east I found that most of the buying was being done on a hand-to-mouth basis and none of the mills are buying for more than their immediate requirements," said Mr. Killam. "Pulp stocks the world over are low. Japan is the only exception and I base that on the report of our own representatives in the Far East.

"While the market has been weak and prices unjustifiably low, the shortage of stocks creates a situation susceptible to rapid improvement as soon as there is a general quickening in the demand. The pulp industry is dependent, of course, on the news print business and when there is an advance in news print there should be a quick response in pulp.

"Price cutting continues to be one of the chief menaces to the pulp industry. So long as some mills will disregard all attempts to set a fair, basic price based on costs of production there cannot be any worthwhile stabilization."

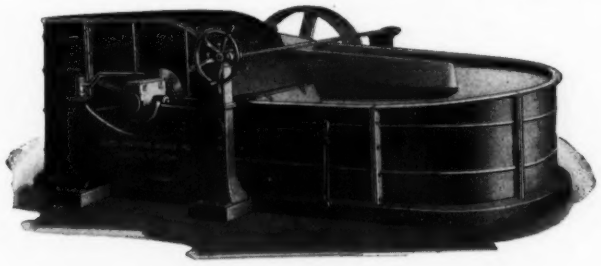
Seeks Legalization of Pulpwood Exports

A despatch from Winnipeg says: On the ground that a lucrative trade is now being lost, an effort is being made to have the legislation rescinded prohibiting the exportation of Manitoba pulpwood. It is being contended here that a revenue of $750,000 annually is being lost, of which sum $40,000 is being diverted from the provincal treasury.

Some years ago about thirty of the smaller paper mills in Minnesota and Wisconsin were being supplied with Manitoba pulpwood. These mills, it is stated, are now being supplied by other sources and the trade has been lost.

Pulpwood owners are endeavoring to get the law amended so that "pocket grinders" may be installed in or near Winnipeg, capable of grinding about 40,000 cords of pulpwood annually for shipment to the mills south of the line.

HIDDEN VALUES



Altho Dilts New Type Beaters have many features which are obviously distinctive, there are also many details of design and construction which are not so obvious or easily described, but which play a big part in their remarkable performance.

Dilts New Type Beaters are designed to make better paper, to beat faster, more thoroughly and with lower operating cost. They are noted for their savings in time, in power, in repair bills and in real beating efficiency.

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MAIL THE COUPON TODAY

DILTS MACHINE WORKS
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Gentlemen: Without obligating ourselves, we would like to discuss with your representatives, certain details pertaining to our Beater Room.

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MACHINE WORKS Inc. FULTON, N.Y.
"Your Paper is made in your Beaters"

Company Name .....

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TAPPI Fall Meeting Dates Changed

At a meeting of the general committee in charge of arrangements for the Fall meeting of the Technical Association of the Pulp and Paper Industry, to be held in September, in Kalamazoo, Michigan, it was unanimously agreed to change the dates of the meeting from Wednesday, Thursday, and Friday, September 23rd, 24th, and 25th to Thursday, Friday, and Saturday, September 24th, 25th, and 26th. This action was taken when attention was called to the fact that the formal opening of the newly completed building for the Institute of Paper Chemistry, at Appleton, Wisconsin had previously been scheduled for Wednesday, September 23rd, and announcements have been forwarded to this effect. By advancing the dates for the meetings, one day, it will be possible for those who are interested, to attend the opening of the Institute on Wednesday and reach Kalamazoo in time for the meetings.

The committee is planning to schedule fewer papers on Thursday, and devote more time to mill vistiations, so that those coming in on Friday will have an opportunity to hear most of the papers presented.

Considerable progress is being made by the various committee in charge of arrangements. Several novel features are planned which are new to these meetings, one of them being the advertising space to be available in the official program. It is announced that none of the advertisements will face one another, each one being opposite a page in the program of meetings and entertainment, a feature that should make this type of advertising of real value. E. F. Whittington of the Sutherland Paper Co. is in charge of this work and anyone interested in obtaining space can obtain full details from him.

Ralph Hayward, general chairman, reports that particular attention is being paid to the type of papers to be read at the meetings, in order that those attending the convention may be assured of a well balanced and educational program.

TAPPI Fall Meeting General Committee

Reading from left to right. Back Row: John C. Wood, Kalamazoo Vegetable Parchment Co.; Frank D. Libby, Kalamazoo Vegetable Parchment Co.; Harry C. Bradford, Rex Paper Co.; Ernest J. Turner, Paper Makers Chemical Co. Middle Row: Arthur C. Dreshfield, Paper Makers Chemical Co.; Elbert G. Milham, Bryant Paper Co.; Ralph Hayward, General Chairman, Kalamazoo Vegetable Parchment Co. Front Row: E. Frank Whittington, Sutherland Paper Co.; W. J. Lawrence, Paper Makers Chemical Co.; Mrs. E. F. Whittington; Carl C. Schnieder, Hawthorne Paper Co.; W. Kent Kidder, Allied Paper Mills.

Provisions are also being made for an enjoyable ladies program during the three day session. Bridge luncheons, sight seeing tours to the many points of interest in and around Kalamazoo, joint evening dinners, and a joint outdoor sports program are being planned by the committee in charge.

Hotel Accommodations

The committee announces that the Columbia, and the Park-American Hotels have been named as the official hotels for the meeting, and that meetings will be held in both places.

They also announce the following schedule of rates which will apply during the convention.

Columbia Hotel:

Rooms with combination tub & shower
Single $3.50 — Double $5.00
Rooms with bath (tub or shower)
Single $2.50 — Double $4.00
Rooms without bath—
Single $1,50, $2,25. Double $2.50, $3.50

Park-American Hotel

Rooms with bath—Single $2.25, $2.50 and $3.00
Rooms with bath—Double $3.25, $3.50 and $4.00
Rooms without bath—Single $2.00, Double $3.00
Twin bedroom suites, $4.50, $6.00 and $7.00 per room

These two hotels are situated directly across the street from each other and offer equally desirable accomodations. The Hotel Burdick and Rickman Hotel are also available for reservations for those who may desire them. The committee recommends that reservations be made as early as possible, direct to the hotels, in order that adequate accomodations may be assured.

Local Paper Mills

Kalamazoo has, within the city proper, nine paper mills manufacturing a variety of paper products, and also branch plants of the Paper Makers Chemical Corporation, and the Kalbfliesch Corporation in addition there are five paper mills situated within short distances of Kalamazoo, and all of these mills will be open for visitation during the convention. In addition to the paper mills, there are many other manufacturing plants of interest in Kalamazoo, and inspection of some of these is being planned. Further information will be given regarding these plants and their products in later issues of the journal.

Caslon Bond Agents To Meet August 20-21

The annual meeting, golf tournament, and mill inspection tour of the agents for Caslon Bond will be held on August 20 and 21 this year, it is announced by F. J. Baldwin, sales manager of the Munising Paper Co., Munising, Mich.

The first day will be devoted to the mill and to a general business session, following which the party will move to Blaney Park, where, after a dinner of planked Lake Superior whitefish, advertising activities will be discussed.

On the morning of August 21 will be held, at Blaney, a meeting exclusively of the agents. This will be followed by a general discussion, and that afternoon and the next day the golf tournament, a dance, and other less serious activities will rule.

Early plans being formulated indicate that the meeting will be attended by an even larger group than last year. including Caslon Bond paper agents from all parts of the United States, Mr. Baldwin said.

Obituary

Waldo Elliott Pratt

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 20, 1931—The funeral of Waldo Elliott Pratt, president of the Hollingsworth & Whitney Company for twenty years, was held at the First Congregational Church, Wellesley Hills, Friday afternoon, with a large attendance, including many representatives and members of the staffs of the Boston, Chicago and New York offices of the company, besides a number from the Boston paper trade.

Mr. Pratt, who was 71 years old and lived at 51 Abbott Road, Wellesley Hills, died suddenly at his summer residence at Sebago, Me., Tuesday, July 16. He had been ill for some time, but was apparently recovering. He had been associated with the Hollingworth & Whitney Company for 54 years. He retired as president last March.

Mr. Pratt was a man of the highest type, of a modest and unassuming character. He was very liberal and always ready to give for any good cause, being a contributor to many charities, of which he never talked. At the time of his death he was chairman of the Arbitration Committee of the Boston Paper Trade Association. Known throughout the country, he was interested in many enterprises.

Besides being president and director of the Hollingsworth & Whitney Company, he was treasurer and director, Dean Foundation for Little Children, Inc.; president and director, Gardiner Water Power Company; vice-president and director, Hollingsworth & Whitney, Ltd., of Canada; president and director, Kennebec Water Power Company; treasurer and director, Massachusetts and Rhode Island State Young Men's Christian Association; vice-president and director, Paper Mill Insurance Company; director, Wellesley Hospital Fund, Inc.; director Wellesley Trust Company., and trustee of Woodlawn Cemetery Association.

Mrs. Pratt, a son, Waldo E., Jr., a daughter, Mrs. John T. Gyger, of Portland, Me., a sister, and eight grandchildren are living.

Wm. N. Smith

Wm. N. Smith whose death on June 22, 1931, was briefly announced in the PAPER TRADE JOURNAL recently accomplished remarkable results in developing the mill and converting plant long known as the Bogota Paper and Board Company of Bogota, N. J.

A small plant was started at that location by local interests about thirty-five years ago. Soon after it began operation Mr. Smith was invited to leave his interests in Connecticut and take charge of the plant. He purchased an interest in the business and took active charge of the mill. The property was absorbed by the consolidation making up the old United Box Board and Paper Company. It was later severely damaged by fire after which Mr. Smith purchased an adjacent site and erected a wholly new mill. He subsequently repurchased the burned property although the new mill had in the meantime been brought into a production of approximately twenty tons per day which was well in keeping with the most advanced practice of those days.

The payroll then carried probably fifty or sixty employees while today the company employs at least two hundred and twenty-five. Its production has been increased under his wise and energetic management from twenty to one hundred tons daily. Practically this entire volume is now absorbed by a modern and efficient container plant located adjacent to the mill in a building erected especially for the purpose about ten years ago. More recently, a fully equipped corrugated plant has been added in a spacious and well designed building completed last year.

Here, within a single life time the property valuation has grown to about two million dollars from an initial investment of a few thousand dollars; an achievement of sufficient proportions to merit the respect and admiration of our present day and generation.

While the board mill demanded and received the major share of his attention, his name was invariably to be found on the roster of those who were working for local improvement whether civic, commercial or industrial.

He served three terms as Mayor of Bogota from 1911 to 1916 furnishing an administration that is regarded by many as a model of economy and efficiency. Home building seemed to be one of his greatest interests since there are many comfortable houses throughout the town built through his assistance either directly or through the Bogota Building and Loan Association of which he was president for many years and up to the time of his death.

In 1919 he gave his support to the organization of the Bogota National Bank and has served as its president during the twelve years intervening during which time it has grown from a very modest beginning to its present status, with assets of around $2,000,000.

His interest in church activities is best evidenced by the fact that he founded the Smith Community Church in the neighboring borough of Teaneck and was a member of the Consistory or governing board of the Second Reformed Church of Hackensack.

Adolph Hartung

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, July 20, 1931.—Adolph Hartung, founder and for more than forty years head of the Quaker City firm of A. Hartung & Co., Inc., 506 Race street, died at his home in Philadelphia following a year's illness from diabetes. Mr. Hartung was 67 years of age. He was a pioneer paper distributor, featuring box makers papers and later branching out into the fine paper division.

For the past eleven years Mr. Hartung had been retired from the industry, the business being conducted by his sons, A. Richard Hartung and Edward W. Hartung. He was a former president of the Philadelphia Paper Trade Association and one of its earliest members. The present site of the nine-story Hartung Building, which houses the fine paper and box paper business of A. Hartung & Co., Inc., was built as a monument to the scene of early days of his boyhood and was constructed on the site of the Hartung home originally owned by his parents and where he spent his youth.

The late head of the Hartung business was one of the most progressive of paper merchants in the Quaker City and had a host of friends in the trade and the allied industries of the box making trade. Surviving are his widow, Mrs. Jennie W. Hartung, and his three sons—Edward W. and A. Richard Hartung, now associated in the firm, Robert Hartung, and two grandchildren.

Leaves American Tissue Mills

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mas., July 14, 1931.—Alfred J. Hermanson who has been general sales manager for the American Tissue Mills Inc. for the past two years has resigned his position and returned to his Chicago home. His future plans are not known.

New York Trade Jottings

Johaneson, Wales & Sparre, Inc., wood ship agents and importers, of 250 Park Avenue, New York, have filed notice of an increase in capitalization from $100,000 to $300,000.

* * *

Summerfield Eney, Jr., of the Champion Coated Paper Company, with offices at 230 Park Avenue, New York is recovering from a serious throat trouble. He is recuperating at Candler, North Carolina.

* * *

Lee H. Hulett, sales manager of the Chemical Paper Manufacturing Company, is now also sales manager of the Crocker-McElwain Company, paper manufacturers, with offices at 41 Park Row, New York.

* * *

The New York Association of Dealers in Paper Mills Supplies, Inc., are to hold their annual outing on Sunday, August 16 at the picnic park owned by Louis Leonardis, at Highlands, N. J. Tickets are $5 and the party embarks at the foot of Cedar street, New York. Fred H. Chase is chairman of the committee that is in charge of the entertainment.

* * *

Hayward Beatty has been appointed manager of the Fine Paper Department of Geo. W. Miller & Co., Inc., of 284-290 Lafayette street, New York. Previous to accepting this position he was representative for the Collins Manufacturing Company, of North Wilbraham, Mass., for one year. He was connected formerly with the American Writing Paper Company in the Sales Promotion Department for about nine years. Mr. Beatty has had experience in both the merchandising and manufacturing ends of the fine paper industry and should prove an invaluable acquisition to Geo. W. Miller & Co.

* * *

Addressing the Collector of Customs at this port, the Bureau of Customs reaches the conclusion that certain fancy paper boxes and perfume bottles, imported together, should pay duty at the rate of 75 per cent ad valorem as entireties under Paragraph 218 of the Tariff Act of 1930. it being understood that the said bottles are produced otherwise than by automatic machine and that the boxes are not unusual coverings subject to the provisions of Section 504 of the Tariff Act. As this ruling will result in higher duties than are now assessed the change in practice will be made effective only as to merchandise imported or withdrawn from warehouse after thirty days after publication of this decision in the weekly Treasury Decisions.

* * *

With the election of E. Victor Donaldson, president and general manager of the Robert Gair Company, to the board of directors of Maritime Paper Products, Ltd. of Halifax, Nova Scotia, the Gair Company has extended its activities to Canada and holds a substantial interest in the Halifax concern. Maritime Paper Products Ltd. was organized recently for the manufacture and sale of corrugated paper boxes and containers. The company has just completed and put into production at Halifax a plant with an area of 30,000 square feet completely equipped with modern box making machinery. The Robert Gair Company is one of the oldest manufacturers of paper board and paper board products in the United States. It operates mills at Piermont and Tonawanda, N. Y., New London and Shelton, Conn., Haverhill and Boston, Mass., and Quincy, Ill. Executive offices are at 420 Lexington avenue, New York City.

RECEIVER FOR GREAT LAKES

(Continued from page 9)

stood from reliable sources that the intention behind the move is to ensure allocation of sufficient tonnage for the two Great Lakes paper machines to provide earnings that will not only take care of accuntuated and future bond interest requirements, but also allow something on the common stock.

It was also learned that the Great Lakes mill has now tonnage guaranteed to it up to fifty per cent. of its capacity. Subsequent arrangements to arise from the formation of a new company are expected to increase this figure to close to 100 per cent. capacity. The common stock of Great Lakes is held by the Minnesota and Ontario Paper Company, to which it was turned over by E. W. Backus, who is president of both companies. The intention appears to be to incorporate a new company whose capital shall be the present capital of Great Lakes less the bonds and charges thereon. This equity amounts to approximately $32,000,000.

Notes and Jottings of the Trade

Provincial Paper, Ltd., Port Arthur, Ont., have awarded contract for the construction of an $8,000 wood pulp system of storage tanks at the plant at Bare Point. The tanks are to be 30 feet in diameter by 40 feet in height, concrete construction, tar and gravel roofing.

J. J. Herb, an old Ontario paper maker, now manager of the Westminster Paper Mills at New Westminster, B. C., has returned from an extended visit to the Antipodes, during which he established contacts with a number of paper firms in various countries. He stated that conditions were practically the same across the Pacific as are being experienced on this side of the continent as far as business is concerned.

Norman E. Wainwright, president of the Don Valley Paper Company, Ltd., Toronto, has been spending his vacation with his family in the Lake Simcoe district.

A. T. Brown, of E. Pullan, Ltd., waste paper dealers, Toronto, is spending a few weeks at his summer cottage near Bowmanville.

A charter has been granted Purity Fibre Products Company (Canada) Ltd., to manufacture, buy, sell or deal in paper and other products, with headquarters in Toronto, and a capital stock of 10,000 preferred shares of $10 each and 10,000 common shares without par value. Among the incorporators are E. Taylor, B. Folliott and Charles Kapelle.

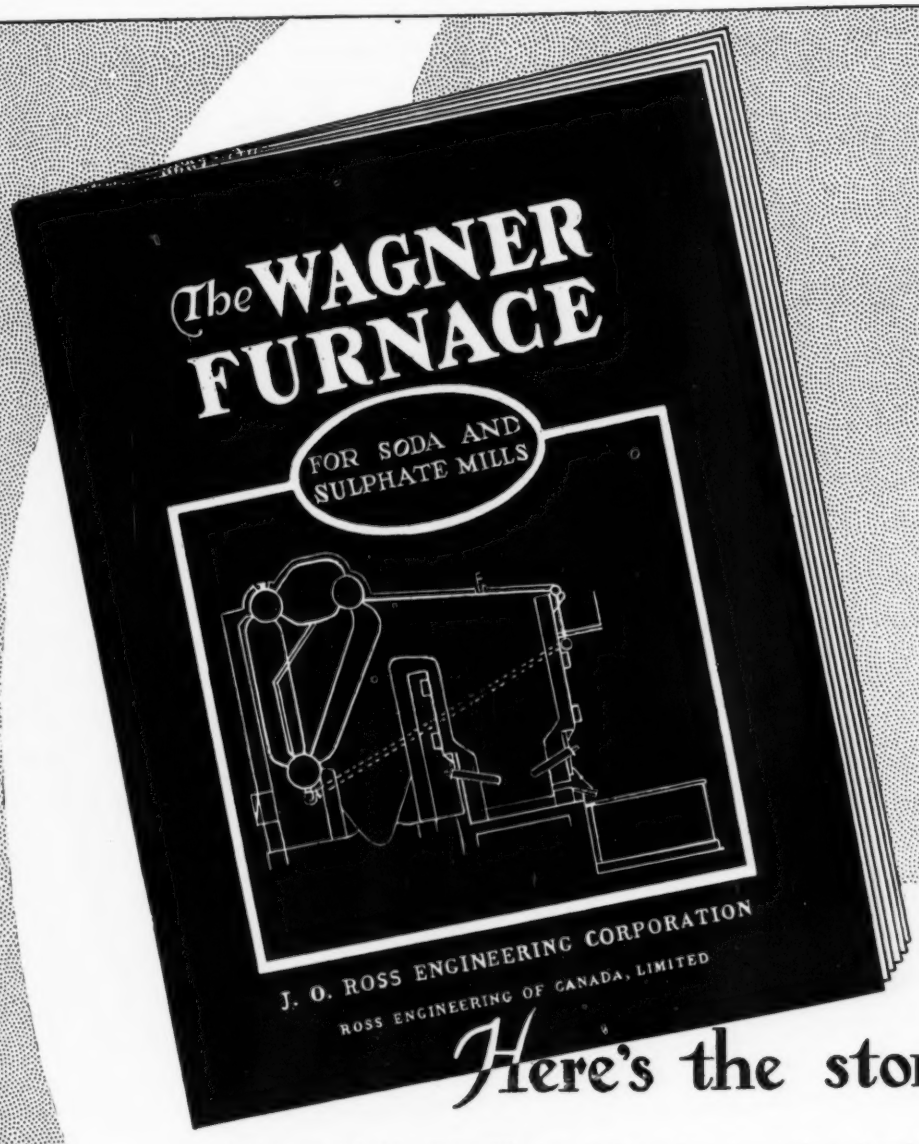
Canada Sand Papers, Ltd., with headquarters at Preston, Ont., and a capital stock of $200,000, has been incorporated. The company will manufacture and deal in all kinds of finished abrasive papers, cloths and silicon carbide.

Two hundred and fifty men are at work for the Atlantic Seaboard Pulp and Paper Company, near Riverside, Albert County, N. B., and during the next few months will cut over 10,000 cords of pulpwood.

George C. Winlow, sales manager of the Alliance Paper Mills, Toronto, is spending the week ends at his cottage in Honey Harbor on Georgian Bay.

F. S. Fielder, of the Fielder Paper Box Company, Toronto, has returned to the city after having attended the National Paper Box Convention in San Francisco, where he represented Eastern Canada mills.

Fred W. Halls, of the Fred W. Halls Paper Company, staged his 21st annual corn beef and cabbage dinner at his residence in Indian Grove, Toronto, on July 15, when he was host to many friends in the Toronto paper trade as well as some guests from Chicago, Detroit, Montreal.



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CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Nutley, N. J.—George LaMonte & Son, Inc., 229 Kingsland road, manufacturer of safety paper goods, has asked bids on general contract for a new addition to plant, consisting of a two and three-story structure, reported to cost over $40,000, with equipment. It is understood that a portion of the new unit will be used for office and operating service. Jardine, Murdock & Wright, 347 Madison avenue, New York, are architects.

St. Louis, Mo.—The E. S. Hager Paper Box Company, 125 South Eighth street, is concluding arrangements for a consolidation with the Connelly Manufacturing Company, 2038 Walnut street, manufacturer of similar paper cartons, folding boxes, etc. The new organization will carry out an expansion program for increased output and proposes to acquire the plant and business of the Holman Paper Box Company, 309 North Third street, St. Louis. It is understood that the consolidated organization will concentrate operations at the last noted plant, providing facilities for the three lines of production.

Boston, Mass.—The Binford Paper Box Company has been organized with a capital of 100 shares of stock, no par value, and plans operation of local plant for the manufacture of paper boxes and containers. The new company is headed by Whitcomb P. Oury, president; and Jesse E. Phillips, 7 Timothy avenue, Cambridge, Mass., who will be treasurer and company representative.

Watertown, N. Y.—The Watertown National Bank, Watertown, acting as trustee for the Oswegatchie Paper Company, with main mill at Natural Dam, St. Lawrence County, and pulp mill at Emeryville, N. Y., is planning for early sale of the properties of the company under mortgage foreclosure proceedings. The mills have been inactive for a period of about two years.

Sturgis, Mich.—The Harvey Paper Products Company, Sturgis, has awarded a general contract to Frank L. Shoemaker, Sturgis, for proposed new addition to mill for the manufacture of paper cups, plates and kindred products. The expansion program is reported to cost close to $40,000, including equipment.

Los Angeles, Cal.—The Sterling Paper Box Company, Ltd., care of Kaye & Johnstone, 1134 Bartlett Building, Los Angeles, attorneys, recently formed with a capital of $25,000, is said to have plans under way for the early operation of local plant for the manufacture of a line of paper and cardboard boxes and containers. The new organization is headed by E. W. Buckley and E. S. Morris, both of Los Angeles, and C. W. Lynch, Monrovia, Cal.

Three Rivers, Que.—In connection with the proposed new local mill of Canadian Industries, Ltd., Montreal, Que., for the manufacture of cellulose transparent wrapping materials, the company will operate in close cooperation with the duPont Cellophane Company, River Road, Buffalo, N. Y., both interests being affiliated with E. I. duPont de Nemours & Co., Wilmington, Del. The company has acquired a large tract of land at location noted, and has plans in progress for initial units of the new mill, to include a power house, pumping plant, machine shop and other mechanical units. The entire project is reported to cost close to $1,500,000, and plant is expected to be ready for operation early next spring. It is understood that the duPont Engineering Company, duPont Building, Wilmington, Del., an affiliated organization, will arrange plans for the project. Arthur B. Purvis is president and managing director of Canadian Industries.

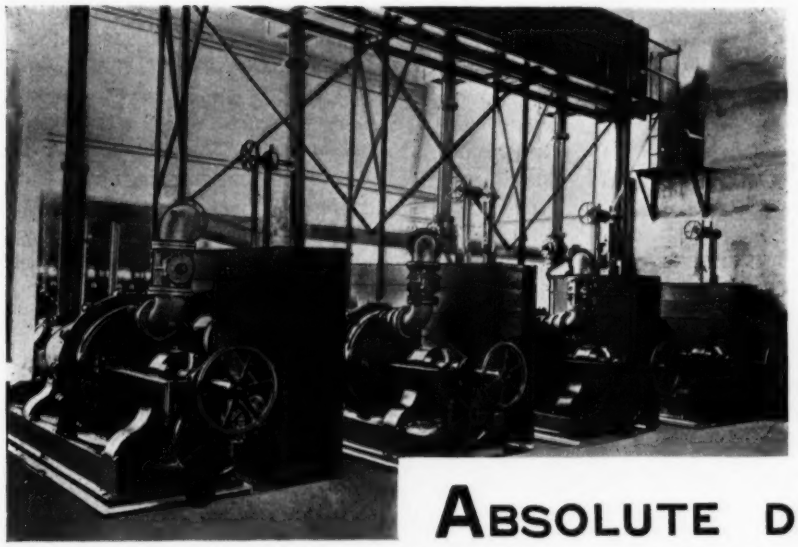
Springfield, Mo.—The Cassidy Paper Box Company, Springfield, recently organized with capital of $30,000, by John Cassidy, Springfield, and associates, is establishing a new local plant for the manufacture of paper dishes and kindred products, including bread trays, etc. The new unit will also be used for the manufacture of paper boxes and containers, and is reported to cost close to $25,000, with initial equipment.

Seattle, Wash.—The Lone Star Timber and Pulp Company, Seattle, D. A. Grover, president and general manager, is said to have plans maturing for proposed new pulp and paper mill on the west coast of Vancouver Island, B. C., at a place known as Port Renfrew. It is understood that active construction will proceed in the fall. The plant will consist of a number of buildings, with boiler plant and other mechanical units, and will represent an investment in excess of $1,500,000.

Worcester, Mass.—Officials of the Norton Company, Worcester, manufacturer of abrasive products, have organized the Behr-Manning Corporation, under Massachusetts laws, with capital of $4,500,000, to take over and operate the company of same name with headquarters at Troy, N. Y., and main plant at Watervliet, used for the manufacture of abrasive papers, sandpaper and kindred products. The Norton company recently acquired a controlling interest in the Behr-Manning organization. The new company will be headed by John A. Manning, president; Francis E. Gallagher, vice-president; and Maximilian E. Pesnel, treasurer.

Clinton, Mass.—The Colonial Press, Inc., 470 Atlantic avenue, Boston, Mass., specializing in the printing and production of paper boxes, cardboard containers, etc., has taken over a portion of the former Lancaster Mills, Inc., Clinton, previously used for textile service, and will occupy for a new plant unit. Machinery will be installed at once, and it is proposed to have the plant ready for service early in August.

Rockford, Ill.—Paul Bennett Paper Boxes, Inc., 1008 Mulberry street, Rockford, recently formed by Paul P. Bennett, Rockford, and associates, with capital of $40,000, plans operation of local plant for the manufacture of paper cartons, cardboard boxes and similar containers. L. S. Thulander, Rockford, is interested in the new organization.



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FOREIGN PAPER TRADE

Exports of paper and paper products from the United States during May were valued at $2,194,329, a decrease of 20 per cent over the same month last year and 7 per cent over the preceding month. During the first five month period they were valued at $10,190,118, or a decrease of 28 per cent as compared with the same period last year.

Compared with the corresponding month last year as well as with the preceding month, there was one noteworthy increase and that occurred in our exports of other paper board, which totaled $280,928 in May, being an increase of 52 per cent over May, 1930 and 145 per cent over April, respectively. During the five month period exports of this item, however, fell 12 per cent short of last year's record.

Small increases, compared with the same month last year, were registered in greaseproof and waterproof papers, toilet paper, box board (paper board and straw board), bristols and bristol board and paper bags. Exports of box board were 108 per cent higher than in the preceding month, while overissue and old newspapers gained 25 per cent, amounting to $128,338 in May.

The heaviest loss occurred in book paper, not coated, as compared with a year ago, only $82,509 worth of this product being exported in May as compared with $197,626 last May. Other heavy losses were as follows: Tissue and crepe paper, 53 per cent, filing folders, index cards and other office forms, and other writing paper, each 45 per cent, fiber insulating lath or board 37 per cent; sheathing and building paper, and vulcanized fiber sheets, strips, rods and tubes, each 33 per cent while news print, wrapping paper, wall paper, envelopes, boxes and cartons were from 25 to 30 per cent lower than a year ago.

Compared with the preceding month the heaviest loss occurred in exports of wall paper, which amounted to $18,753 in May as against $39,835 in April, while exports of greaseproof and waterproof papers, tissue and crepe paper, other writing paper and vulcanized fiber sheets, strips, rods and tubes were from 15 to 25 per cent lower than in April.

During the five month period only a few items registered an increase over the corresponding period last year, namely, greaseproof and waterproof papers, the exports of which amounted to $396,823, or an increase of 47 per cent, cash register and adding machine paper which totaled $252,640, or a gain of 15 per cent, while the exports of paper bags, which amounted to $384,130, and those of paper towels and napkins which totaled $356,030 represented slight increases over last year's record.

The losses, on the other hand, were numerous and rather heavy, headed by book paper, not coated, which declined 57 per cent, followed by greaseproof and waterproof papers and tissue and crepe paper, each of which declined 47 per cent; news print, wrapping paper, surface coated papers, papeteries (fancy writings), fiber insulating lath or board, wall board of paper or pulp, which showed decreases from 38 per cent to 42 per cent; other writings, blotting paper, boxes and cartons, vulcanized fiber, sheets, strips, rods and tubes, envelopes, blotting paper, cover paper, the exports of which were from 30 to 35 per cent lower, while decreases from 20 to 25 per cent were registered by paper towels and napkins, wall paper, and filing folders, index cards and other office forms.

May exports of paper base stocks amounted to $295,481, a decrease of 38 per cent over the preceding month and 20 per cent over the corresponding month last year. During the first five month period they declined 40 per cent over the same period last year, the heaviest decreases occurring in pulpwood, which declined 67 per cent, soda wood pulp which was 55 per cent lower and rags and other paper stock which showed a loss of 35 per cent.

Our imports of paper and paper products in May amounted to $12,195,662, being slightly higher than in the preceding month but slightly lower than a year ago. During the first five month period there was a 12 per cent decrease as compared with the same period last year. News print imports in May amounted to $10,437,211, being a slight increase over the preceding month but a 15 per cent decrease over a year ago. Our imports of cigarette paper, cigarette books and covers reached a new high record in May, amounting to $1,017,675, as compared with $341,594 a year ago and $532,632, the preceding month. During the five month period the imports of this product were 73 per cent higher than in the same period last year.

The only other items which showed a gain over May, 1930, were duplex decalcomania paper, not coated, the imports of which were approximately twice as high, and surface coated papers which were slightly higher. During the five month period our imports of all paper products, with the exception of cigarette paper, cigarette books and

covers, were considerably less than in the same period last year.

Imports of paper base stocks in May amounted to $4,663,906, representing a 35 per cent decrease over the same month last year, while during the five month period they were approximately 38 per cent lower than last year, the most important losses being as follows: Pulpwoods, 42 per cent; rough spruce, 82 per cent, peeled spruce, 43 per cent, unbleached sulphite wood pulp, 36 per cent, and unbleached sulphate wood pulp, 47 per cent.

Brotherhood Officials Visit Mills

[FROM OUR REGULAR CORRESPONDENT]

FORT EDWARD, N. Y., July 20, 1931—Officials of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers headed by John P. Burke, president, left early this week on a business trip to the principal mill towns in this country and Canada where a number of conferences with manufacturers are planned. Plans call for a stop at Tonawanda where an address will be delivered by Mr. Burke on Sunday afternoon before the entire union body at that place. From there the officials will proceed to Thorold, Canada, where a public safety rally has been arranged by the Ontario Paper Co. in honor of their visit.

Upon leaving Thorold it is Mr. Burke's intention to proceed to Toronto to hold a conference with officials of the Abitibi Power and Paper Company regarding working conditions and he also plans to meet officials of the St. Croix Paper Company, at Woodland, Me., for a similar discussion. The program also calls for an address by him at a labor rally at Bucksport, Me., while late this month he is expected to return for a conference with officials of the Union Bag & Paper Co., at Hudson Falls.

It is reported that workers employed by the Union Bag and Paper Corporation have been asked to take a wage reduction by officials and a meeting has been called for July 28 at which a decision will be made by labor leaders. The offer is said to contain a provision that those employes receiving wages under 41 cents an hour will not be affected. The request is said to have arisen from the action of union officials in consenting to wage cuts in otther mills in this country and Canada. It was learned, however, that when the wage agreement was signed between officials of both factions last spring it was agreed not to cut wages providing the other mills were not allowed reductions. The reductions requested are said to range from five to ten per cent in accordance with the earning capacity of the workers.

Chicago Paper Salesmen to Hold Golf Outing

CHICAGO, Ill., July 18, 1931.—The July golf outing of the Middle West Division of the Salesmen's Association of the Paper Industry will be held on Friday afternoon, July 24, at the Westmoreland Country Club, according to the announcement sent out this week by Henry Johnson, of the Brown Company, golf chairman. Instead of the usual all day play the members will be asked to confine their golfing activities to the afternoon, permitting the lady members of the club to tour the course in the morning. The dinner will be held at eight o'clock in the evening to permit the more hardy souls to play 27 or 36 holes. An extra prize will be given for 27 hole totals, says Mr. Johnson. An unusually large turnout is expected to tour the sporty Westmoreland course—and it's dollars to doughnuts that the scores will be high!

Oswegatchie Bondholders Urge Action

[FROM OUR REGULAR CORRESPONDENT]

GOUVERNEUR, N. Y., July 20, 1931—The first mortgage bondholders' committee of the Oswegatchie Paper Company has sent notice to the holders of the $598,000 in outstanding mortgage bonds urging concerted action for their own protection in connection with the mortgage foreclosure sale being held late this month. The bondholders' committee is composed of Charles W. Valentine, Samuel Child, Ivan J. Gotham, Harry M. Goulding and Nelson R. Caswell. The notification specifies that there has been a default in the payment of interest and principal of the six percent first mortgage bonds, no interest having been paid since February, 1928, on many of the coupons prior to the default. The second and refunding mortgage was issued on which there is now outstanding about $900,000 in bonds which are also in default.

The mills of the company suspended operations about two years ago and taxes have not been paid on the property. here have been rumors relative to resuming on numerous occasions but these have proven groundless. Following a request by the bondholders the Wartertown National Bank acting as trustee was given permission to take possession of the property in the fall of 1930 and it is conserving it under a temporary mortgage. It was also learned that the trustee has advanced $23,000 for taxes, $10,000 for insurance and about $11,000 for the services of a caretaker and expenses, on which amounts interest has accrued. The taxes for 1931 are outstanding and expenses for maintaining the property are said to be accumulating. A number of judgments have already been taken against the company.

Demolishing Tower at Fenimore Mill

HUDSON FALLS, N. Y., July 20, 1931—The task of demolishing the tower at the Fenimore mill of the Union Bag and Paper Corporation is proceeding rapidly under the supervision of the firm of Miner & Holland, of Glens Falls. The project is the largest ever attempted by a wrecking crew in this section and the dynamiting of the remaining portion will be undertaken within the next few days. The structure was formerly used by the sulphite department and is over 185 feet in height. It is estimated that it contains nearly 200,000 feet of timber and company officials state that a large percentage of this material can be used after demolition.

The tower was constructed a number of years ago and is visible from all parts of this vicinity. The decision to remove the structure was made following a report that extensive repairs would be required in order to make it safe and because also it was no longer needed for manufacturing purposes. Several acid tanks reaching from the ground to the top of the tower are included in the demolishing process which is expected to consume a few more weeks. The tower itself contains several partitions and is sixty feet long and forty feet wide.

Awards for Government Paper

WASHINGTON, D. C., July 22, 1931—The Mathers-Lamm Paper Company has been awarded the contract for furnishing the Government Printing Office with 36,000 pounds (7,200 sheets) of No. 2 quality, 34 x 44, No. 10 hard rolled binders board at 30.922 cents per pound, bids for which were received on June 26.

Reese & Reese will furnish 4,560 pounds (12,000 sheets) of 19 x 24 heavy white blotting paper at 14.68 cents per pound, bids for which were received on June 29.

(No. 5 of a series of advertisements tracing the development and uses of modern chemicals.)

HIGH SPOTS IN CHEMICAL HISTORY

SODA ASH

A mob of French revolutionists at St. Denis, France, ransacked the first plant erected for manufacturing soda ash by the Leblanc process.

WHILE Paris thrilled at Napoleon's victories in Austria, Nicolas Leblanc ended a life of frustrated hopes by committing suicide. In the early days of the French Revolution he had seen his soda works confiscated by an angry mob... his dream of a lifetime shattered. In building the first commercial plant for manufacturing soda ash (1791), Leblanc gave his country... and the world... a process which was a forerunner of present-day methods of manufacturing one of man's most useful commodities... soda ash.

The beginning of the modern ammonia-soda process, now the universal method of producing soda ash and the only method ever used in the American alkali industry, dates from 1838. No successful manufacture by this process is recorded, however, until after 1860, and it was not until 1895 that the production of soda ash by the ammonia-soda process exceeded that by the old Leblanc process.

In the United States, the glass industry takes annually about 590,000 tons of soda ash. Then, there's the chemical industry using 290,000 tons ... the soap industry taking 200,000 tons... to say nothing of the textile, rayon, pulp and paper, petroleum, steel, iron and food industries... as well as the manufacturers of dyestuffs, leather and photographic materials. In fact, so widespread is the use of this important basic chemical that soda ash consumption is considered one of the reliable barometers of industrial activity.

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Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Current Papermaking Literature

Abstracts of Articles and Notes of Papermaking Inventions Compiled by the Committee on Abstracts and Bibliography of the Technical Association of the Pulp and Paper Industry

Clarence J. West, Chairman

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Paper and Pulp Testing

Wood Pulp Testing for Fine Paper Mills. S. H. R. Edge. World's Paper Trade Rev. 94: 1818-1822, 1874, 1876; 1966-1972, 2148-2162 (Nov. 21, 1928). Paper Mill 53, No. 52: 16-17, 20-21 (Dec. 27, 1930).—A description of the changes made in the wood pulp testing for the fine paper mills of the Wiggins Teape and Alex. Pirie groups as a result of the work of the pulp evaluation committee of the Technical Section of the Paper Makers' Association of Great Britain. The initial strength test alone is practically valueless for the fine paper mills; the pulp is therefore subjected to treatment for a definite number of revolutions (13,500) in a Lampen ball mill and the strength again determined. Though the beaten strength value thus found is not the same as that obtained in the mill, comparison with the initial strength indicates in a general way, though not completely, the behavior of the pulp on beating. During 2 years of application in the mills, it has been particularly successful in finding pulps for special purposes and in preventing the waste which accompanies a mill trail of a pulp really inferior to that normally used for any particular paper. The Lovibond tintometer was found the most satisfactory instrument for measuring the color of the pulp, both unbleached and after bleaching under standard conditions with 10% of bleach. The discussion of the members present at the reading of the paper is reported. A.P.-C.

Calibration of Canadian Standard Freeness Tester. W. Boyd Campbell and W. E. Adlington. Pulp Paper Mag. Can. 31: 750-751 (Jan 1, 1931).—Instructions are given for maintaining the instrument in condition for accurate work. A.P.-C.

Machine for Testing the Strength and Elongation of a Single Fiber. Tamotsu Aoki and Katsumoto Atsuki. Tokyo. Imperial University, Tokyo, Japan. J. Chem. Ind. (Japan) 33 (Supp. Binding): 383-385 (Oct. 1930).—A single fiber is fastened between two clamps. The upper clamp is suspended from a spring which is fixed at its upper end, and the lower clamp is connected with a member by which the lower clamp as well as the fiber and spring are pulled down. The end of the member to which the lower clamp is connected is forced to engage with a spiral groove engraved around a revolving drum, hence as the drum revolves the member is forced downward and the lower clamp is pulled down. In order to make a measurement, when the revolution of the drum becomes constant, a knob is turned and the member is urged into the pitched portion of the groove. At the same time the shutter of a photographic apparatus is automatically opened and successive positions of the clamps are photographed on a printing paper placed on a drum inside the camera. The load-elongation curve of the fiber can be plotted from the photograph, and the load in grams exerted on the fiber is easily calculated from the calibration-curve of the spring. A.P.-C.

An Improved Schopper-Riegler Freeness-Consistency Chart. D. S. Davis. Paper Trade J. 91, No. 21: 49-50 (Nov. 20, 1930).—It is shown that the nature of Korn's freeness-consistency data (*Paper Ind.* 11, 347 (1929) permit the construction of straight-line charts for the purpose of correcting freeness to the standard consistency basis. Two such charts are given. A.P.-C.

Beating of Wood Pulp in Laboratory and Mill. I. The Determination of Beaten Strength. H. Ainsworth Harrison. World's Paper Trade Rev. 94: 1988-1994, 2060-2066, 2104-2110 (Dec. 12, 1930). A detailed description is given of the method used in the laboratory of the Cooke and Nuttall mill for evaluating the beaten strength of pulp, and the various steps of the procedure are discussed. In testing over 80 pulps (mostly kraft and sulphite) by this method, in no instance was any variation from small mill experience obtained. Shipments of pulp are sampled in the same way and at the same time as for the moisture determination. At least 4 lots of pulp (each equal to 24g. of bone-dry fiber) are soaked for 4 hours if air-dry (moist pulps need not be soaked), diluted to 4.1 with water at 15 to 20 degrees C., and disintegrated as described in the 1929-report of the pulp evaluation committee (*Paper Trade J.* 89, No. 10, 61-63 (1929). Each batch of disintegrated pulp is concentrated through a 200-mesh sieve to 3.0% consistency (800cc.) and beaten in the large Lampen mill (10-kg. bronze ball), for the number of revolutions equivalent to periods of 15, 30, 60 and 120 min. if a sulphite pulp, and to 30, 60, and 120 and 240 min. if a kraft pulp, with the mill running at 300 r.p.m., no adjustment of the pH being made. The beaten stock is diluted to 2 liters, cleared from lumps disintegration for 7500 revolutions, and diluted to 10.1 Schopper-Riegler degrees of wetness are determined in triplicate of 833cc. of the

diluted stock (2.0 g. of fiber) diluted to 1.1., no corrections for the fiber content and temperature variations being required. Six sheets are made from each lot of beaten stock, using 500cc. of the diluted stock (1.2 g. of fiber), following the procedure of the pulp evaluation committee. One sheet is retained as a sample; the other 5 are conditioned at least 4 hrs. (preferably 12 to 18 hrs.) at 65% relative humidity; they are treated for bursting, tensile strength, stretch basis weight, and apparent specific gravity as described by the pulp evaluation committee, and for air permeability by the Gurley densometer. Each property is plotted against time of beating. In order to have a single value to express the strength properties of pulp, the *strength factor* is calculated from (bursting factor × 2) + (breaking length/100) + (tear factor/5), giving a value which, though arbitrary and empirical, represents the 3 kinds of strength in something like their relative importance in the author's mill. *The pulp value* is the strength (corrected to 65% relative humidity of a pulp at 40 degrees Schopper-Riegler. The *time value* is the time in min. taken to reach a wetness figure of 30 degrees Schopper-Riegler. *The paper value* is calculated from the paper tests in the same way as the strength factor of the pulp. When an abridged test is required, fairly accurate results may be obtained by carrying out only one beating operation, provided it is for such a period that the maximum wetness value met with in mill practice is reached or passed. Single beating tests may be relied on to give results within 4 to 5% of each other; and by conducting a series of beating operations for different periods the limit of error is probably not more than 2 to 3%. *The drainage time* (time in sec. required for the standard column of water on the sheet-making machine to disappear) is an important property which gives valuable information regarding the conditions of beaten stock; it shows markedly the enormous changes taking place in the character of the pulp at high degrees of wetness, of which the Schopper-Riegler beating tester gives only slight indications; it also differentiates between the rate of drainage of a mechanical pulp and of a beaten chemical pulp, both of which may have the same Schopper-Riegler wetness but which would work differently on the paper machine wire. Ordinary changes in temperature of the water entering the sheet machine produce appreciable variations in the bursting strength, which increased with decreasing temperature; this possibly confirms the impression of many paper makers that paper made in winter is stronger than that made in summer. The average of 200 readings showed the bursting strength is 1.4% lower when the determination is carried out with the glazed side of the sheet down A.P.-C.

The Beating of Wood Pulp in Laboratory and Mill. II H. Ainsworth Harrison. World's Paper Trade Rev. 2241, 2244, 2250, 2336-2340 (Dec. 26, 1930)—Data are submitted to indicate some of the possible applications of the Lampen mill in conjunction with the British standard sheet-making equipment to the solution of phenomena of practical and theoretical interest in paper mill operations. Two kraft pulps made from the same wood, one cooked normally and the other overcooked, had the same rate of increase in strength though the maximum strength was lower. On aging (6 months) the bursting and tensile strength of both pulp and paper fell off appreciably; the tearing strength was unaltered in the pulp, but somewhat lower in the paper. On heating dry kraft pulp at 100 degrees C., for 20 hours, soaking for 4 hours and beating for 30 min., the burst and tensile strengths were much reduced and the tear was increased. A comparison of the behavior of moist (55% water) and dried pulp showed that: (a) the greatest difference in strength between moist pulp and the same pulp when air-dry occurs in the unbeaten state; (b) air-drying of pulp does not result in an irreversible colloidal change of fiber surfaces, since by adequate beating air-dried pulp develops equal strength to the same pulp kept moist; (c) dry pulp increases in strength much more rapidly than moist pulp during the first few min. of beating, the regain in strength being approximately equivalent to that lost during the drying process; (d) moist pulp does not increase in wetness (Schopper-Riegler degrees) more rapidly than dry pulp, provided the latter has been soaked 4 hours. Results of a preliminary investigation on the blending of pulps showed that, as regards wetness, strength, and especially drainage time and air permeability, the values for the blended pulp cannot be calculated from the values for the components. A study of mill-beaten and mill-refined stock, before and after subjecting to a laboratory-beating, showed that: (a) refining contributes about the same wetness effect as laboratory-beating; (b) laboratory-beating decreases stretch considerably more than does refining; (c) refining produces appreciable increase in wetness only at the expense of tear; it greatly increases resistance to air penetration. The difference between laboratory sheets made from mill-refined stock and the mill paper from the same stock must be due to the conditions to which the stock is submitted during its passage from the machine chests to the real end of the paper machine; in one example, the mill paper was 31.4% weaker in burst, 25.3% weaker in tensile, and 20.4% stronger in tear than laboratory-made paper of about the same substance number. It would seem that the pulp disintegrator and Lampen mill together may be considered as the laboratory equivalent of the mill beater and refiner, but with the following 3 main differences: (1) the laboratory method produces a fall in tearing strength at Schopper-Riegler wetness at which the tearing strength may still be increasing in the mill; (2) it produces a greater reduction of fiber length, with consequent decreases in tear; the more or less irregular formation of mill paper may also produce a higher tear than those having the best formation possible on the sheet machine; (3) even under the most favorable conditions, during mill beating it is not possible to treat all the fibers alike, some fibers escaping the action of the roll completely while others are extensively damaged. The author considers that the uniformity of treatment of the fibers in the Lampen mill is the chief reason for the higher bursting and tensile strength of laboratory-beaten paper as compared with laboratory paper made from mill-beaten stock. The strength after beating 1 hour in alcohol was but very little more than unbeaten strength (the actual increase is probably due largely to the inhibition of water with which the fibers came in contact after the beating operation in the formation of the sheet), while the cutting was greater than after 17 hours' beating in water. In an attempt at analyzing the fundamentals of the strength of paper, the author discusses the 4 factors which he considers as primarily influencing paper formation, hydration and strength: fibrillation, surface cohesion and individual fiber strength. A.P.-C.

Bursting Tester Standardization. G. F. Underhay. World's Paper Trade Rev. 94: 2268-2278 (Dec. 26, 1930); 24-28 (Jan. 2, 1931).—Results are given of a comparative study of the Mullen and Schopper bursting testers, showing sources of errors and suggesting remedies for these. The bursting pressure increases definitely with increased speed of operation of the instrument, and the ideal tester is one which will give a perfectly uniform rate of controlled pressure increase. Owing to the construction of and nature of the fluid in the Mullen tester, it does not readily lend itself to modification along this line. The Schopper tester can be easily improved along this line by fitting it with a Dewrance fine regulating valve of the type used in conjunction with pressure gages, which should be placed as close as possible to the needle valve supplied by the makers; in order to control the bursting speed, the Dewrance valve is set to give the desired rate of flow to the diaphram and the needle valve used merely for starting and stopping a test. With papers bursting at a pressure of 0 to 50 lbs., if the air pressure in the reservoir is at 80 to 85 lbs. and the valve is set to reach a pressure of 50 lbs. in 5 sec. the variation in the rate of increase of pressure will produce a maximum strength variation of about 1%. It is shown that the use of a thin red rubber diaphragm is preferable to that supplied with either instrument; more particularly, when using the diaph-

ragm supplied with the Schopper tester it was impossible to record with any certainty a burst of less than 10 lbs. per sq. in., while with a thin red rubber diaphragm bursts of 5 lbs. could be recorded comfortably. When the sharpness of the inside edge of the bell produces a cutting action on a short-fibered wet papers, the difficulty can be overcome by light rubbing the edge with fine emery cloth, which does not appreciably affect the bursting area.—A. P.-C.

Testing the Schopper-Riegler Instrument for the Degree of Beating with its New Automatic Lifting Device for Uniformity of Results. Korn. Wochbl Papierfabr. 61, No. 42: 1336-1341 (Oct. 18, 1930).—By means of a series of tests on chemical pulps, rag stock and ground wood, the new automatic conical lifting device for the Schopper-Riegler apparatus for the degree of beating was tested with the result that the human element in the tests were entirely eliminated. The article is accompanied with comprehensive tables and curves of the various tests along with details regarding operation, etc.—J. F. O.

The Influence of Varying Conditions on the Result of Strength Determinations on Cellulose Pulp. Eberhard Grund. Papier-Fabr. 28, No. 20: 329-337, (May 18, 1930).—From data obtained from a series of strength determinations made on pulp it is shown that similar results are arrived at only by closely adhering to the conditions prescribed in the test. The following conclusions were arrived at. (1) The value for tearing length increases to a maximum with the basis weight, which value lies around 80 grams per square centimeter, and then diminishes. (2) The settling time of the stock in the sheet machine decreases the value of the tearing length up to 15 per cent. (3) The greatest dilution of the stock in the sheet machine in order for the consistency to be independent of the strength determination is about 1 to 750. Greater dilution gives lower strength values and higher consistency has no influence on the strength values. (4) The tearing length increases with increasing pressure up to a maximum which lies between 120 to 150 kilograms per square centimeter pressure and then quickly falls off. (5) The tearing length increases with increasing time of pressing up to a duration of two minutes and then remains almost constant. (6) The tearing length decreases with increase of drying temperature. (7) The tearing length increases appreciable with a decreasing length of strip under tension in the Schopper apparatus.—J. F. O.

Strength Determination of Pulp. E. G. Jonas, Darmstadt. Papier-Fabr. 28, No. 48, 800-805, (Nov. 30, 1930), and Wochbl Papierfabr. 61. No. 48: 1526-1533 (Nov. 29, 1930).—The difficulty of obtaining a beating device which will give reproducable results and will also give results which will compare with the work done by a mill beater is eliminated by the new beating apparatus, which is explained in detail. A description of the sheet machine is also given, a machine is supposed to do away with any human errors.—J. F. O.

Converting the Bursting Pressure for a Certain Area into the Bursting Pressure of a Different Area. G. Bierett and Bruno Schulze, Wochbl Papierfabr. 61, No. 51: 1652-1656 (Dec. 20, 1930).—The authors have found by numerous experiments and calculations that the formula $\frac{pm}{pn} \pm \frac{x\ fn}{fm}$ is adaptable for converting the bursting pressure for a certain area to the bursting pressure of a different area. The value for X lies between 1.6-1.8 depending to some extent upon the characteristics of the paper being tested. This formula is, however, not suitable for papers with a bursting pressure of less than .6 kilograms per square centimeter with an area of 10 square centimeters, since experimental errors have too large an influence. P is designated as pressure and F as area. The article is accompanied with a number of tables and other data.—J. F. O.

The Zeiss Photometer in The Paper Mill. Giro Silvio. Papier 33: 963-974 (Sept., 1930).—A description of the instrument and its operation, and of its use for measuring the gloss of paper, for the examination of fillers and for measuring transparency.—A. P.-C.

The Microscope in Mill Control Work and the Necessity of Courses on the Microscope. Carl G. Schwalbe. Wochbl Papierfabr. 61, No. 50: 1622 (Dec. 13, 1930).—A discussion of the value of the microscope.—J. F. O.

Photometric Determination of the Whiteness of Paper. Drechsel. Papier-Fabr. 28, No. 20: 337, (May 18, 1930).—The article concerns a polemic over the suitability of the Zeiss gradation photometer for the determination of the whiteness or gloss of paper. The method and principal of the photometer is given. The author considers the apparatus in its present state as valueless in its results.—J. F. O.

The Filter Analysis Attachment for the Investigation in Ultra Violet Rays. A Kasten. Papier-Fabr. 28, No. 23:387, June 8, 1930).—The description of a new apparatus for ultra violet ray investigation is given. The apparatus cost only about a tenth as much as the quartz lamp.—J. F. O.

Determination of the Gloss or Finish of Paper by Means of a Gradient Photometer. H. Sommer. Berlin-Dahlem. A mathematical interpretation of the results obtained in measuring the finish of paper with a gradient photometer.—J. F. O.

The Investigation of Pulp and Paper by Means of the Quartz Lamp. Hans Georg Klein. Papier-Fabr. 28, No. 30: 477-480, (July 27, 1930.—A report from the State Material Testing Laboratory, Berlin- Dahlem. The color and the intensity of the fluoresence of the various pulps used in the manufacture of paper are different and very distinct. A list of the principal pulps and their color under the quartz lamp are given. However since, the fluorescence is closely related to the action of light, heat, moisture and chemical influence, a comparative inference only can be drawn. A list of tables showing the range of influence of each of the above factors is given as well as, the method of testing. The quartz can be used in the manufacture of the paper. A list of references are added.—J. F. O.

Miscellaneous

Roofing. Chester E. Rahr, assignor to The Patent and Licensing Corp. U. S. pat. 1,759,999, May 27, 1930.—Asphalt is applied to an otherwise completed sheet of surfaced roofing, along a strip of uniform width, so that when the strips are applied there is formed a guide for the laying of the overlapping strip while the underlying surface can properly take cement for attaching the two strips together so that a weather-proof joint may be effected.—A. P.-C.

Process of Making Continuous Waterproof Sheets and Product Thereof. Lester Kirschbraun, assignor to The Flintkote Co. U. S. pat. 1,767,532, June 24, 1930.—A waterproof binder such as asphalt, rubber, etc., is emulsified in an aqueous vehicle with an emulsifying agent such as clay, to produce a non-adhesive coating about the binder particles and render them non-adhesive. The emulsion is combined with fibrous or non-fibrous material, such as paper pulp, cork, sawdust, etc., in a pug mill and disintegrated. The mixture is delivered from a hopper on to a travelling endless belt which carries it between a series of presses, and the sheet thus formed is passed through a hot chamber to break down the emulsion, set the adhesive binder and cause it to permeate uniformly the interestices of the material.—A.P.-C.

Water Purification for Color Removal. A. S. Behrman, R. H. Kean and H. Gustafson. Paper Trade J. 92, No. 8, 121-123 (Feb. 19, 1931).—Modern methods of color removal are briefly reviewed, and results are given of an investigation into the nature of the coloring matter in water and new methods of removal based thereon. It was found that: (1) The particles of coloring matter are negatively charged. (2) The particles of coloring matter are of a colloidal nature, though some of

them may approach molecular dimensions and consequently be in true solution. (3) The coloring matter in surface waters is essentially organic in nature. (4) In many cases the color deepens considerably with increase in pH of the water, particularly when passing from acid to alkaline conditions. (5) The color is destroyed to a considerable, but variable, extent by chlorination. The excess chlorine must be removed after destruction of the color in order to prevent corrosion; and with all the waters tested it was found that dechlorination by filtration through granular hydrodarco removed not only the chlorine but also the whole of the residual color. Filtration through hydrodarco, without previous chlorination, removed all or nearly all the color; but owing to the necessity of revivification, it is usually more economical to remove as much color as possible by coagulating and filtering under carefully controlled pH conditions, followed by chlorination and then dechlorination if necessary. An attempt is being made to find a method of revivification that will be so simple as to make it practical and economical to decolorize the water directly by treating with hydrodarco, without preliminary coagulation, filtration or chlorination.—A. P.-C.

Paper-Coating Composition. Donald B. Dradner and Charles H. Milligan assignors to The Champion Coated Paper Co. U. S. pat. 1,781,716, Nov. 18, 1930.—Clay or other mineral pigment is used with a chlorinated protein adhesive such as chlorinated casem.—A.P.-C.

Recording Paper Suitable for Typewritten Impressions, etc. Charles W. Mayer and Everett F. Siller. U. S. pat. 1,783,442, Dec. 2, 1930.—A deeply colored paper stock is covered with a waxy, crystallized coating of contrasting color and with an outer layer of inert powder such as talc.—A.P.-C.

Paper for Photographic Purposes. G. T. Lane, assignor to Kodak, Ltd. Brit. pat. 332,743, March 1, 1929.—Paper suitable for use as a support for photographic emulsions is prepared by sizing wood-pulp fiber (preferably having an alpha-cellulose content greater than 90%) in the beater with a saponified saturated fatty acid having an iodine number less than 40 (and preferably less than 5). A size from triple-pressed stearic acid is suitable, and the size may be precipitated with salts such a aluminum sulphate, magnesium sulphate, copper sulphate or potash, soda or chrome alum.—A.P.-C.

Coating Paper. Champion Coated Paper Co. Brit. pat. 333,226, May 3, 1929.—Paper is treated on either one or both sides with uncooked starch made into a slurry with water, with or without a pigment, and the adhesive properties of the starch are developed on the paper by heating. Various other auxiliary substances also may be used, such as gum arabic, waxes, dyes and other coloring substances, and softening agents such as glycerol or castor oil.—A.P.-C.

Paraffined Wrapping Paper. E. Frisch. Belg. pat. 369,973, June 30, 1930.—A series of lines are printed on the paper in white ink, so that the eye can no longer distinguish the lines produced by the folding of the paper.—A.P.-C.

Preparation of Waxed Paper for the Manufacture of Waxed-Paper Bags. P. P. Burbush and Waxed Bags, Ltd. Belg. pat. 371, 634, Aug. 31, 1930.—In order to wax crepe paper, one or more sheets are coated with wax, pressed for a very short time in a heated press and immediately released. The sheets are then separated.—A.P.-C.

Process of Waterproofing Paper. William H. Richardson, assignor to The Richardson Co. U. S. pat. 1,791,040, Feb. 3, 1931.—In order to make waterproof cartons, the printed blanks are sprayed with melted paraffin over the printed side and are then calendered.—A.P.-C.

Manufacture and Production of Cigarette Paper. J. F. M. Crolard assignor to British-American Tobacco Co., Ltd. U. S. pat. 1,790,574, Jan. 27, 1931.—In order to render cigarette paper free from the tendency to become discolored or stained after contact with tobacco, a greasy or fatty matter is incorporated with the paper either during or after its manufacture.—A.P.-C.

Process for the Manufacture of Improved Paper. A. Nathansohn. Belg. pat. 370,885. July 31, 1930.—The stock or the unfinished paper is treated with antihygroscopic and esterifying acid radicals containing 10 or more carbon atoms in the molecule.—A. P.-C.

Cigarette Paper. British-American Tobacco Co., Ltd. Fr. pat. 688,350, Jan. 16, 1930.—The tendency of cigarette paper to change color and become stained with tobacco is prevented by incorporating in the paper during or after its manufacture a fatty material such as sterin.—A. P.-C.

Cellulose Wadding Product. Papeteries de la Robertsau. Belg. pat. 369,966, June 30, 1930.—A layer of sheets of cellulose wadding is subjected to temporary pressure exerted at certain points only The pressure is obtained by means of a toothed disk rotating over the sheets as they pass over a grooved roll, the disk acting on the portion of the cellulose sheets which lie directly over the groove.—A. P.-C.

Process for the Production of Nacreous Sheets. F. K. Wickel. Belg. pat. 370,004, June 30, 1930.—A base giving an optical effect, **e.g.**, mica- coated paper, is covered with a transparent layer having no optical effect over which is applied a brilliant second coating, such as bismuth or antimony oxychloride, which acquires an optical effect on rubbing.—A. P.-C.

Filtering and Decoloring Paper. Walter S. Bayliss, assignor to Filtrol Co. of California, U. S. pat 1,784,509, Dec. 9, 1930.—A filtering paper which is suitable for filtering and decolorizing oils, gasoline, etc., contains an acid-activated clay which contains no free acid.—A. P.-C.

Plastic Board Manufacture. Harry C. Raynes, assignor to Bemis Industries, Inc. U. S. pat. 1,774,813, Sept. 2, 1930.—The invention provides for the making of wallboard with a frangible or cementitious core bound in a paper covering. The principles of the fourdrinier and cylinder mold paper machines are combined with components of the ordinary apparatus for making plaster board, so that the fibrous covering is formed in a substantially integral sheet about an elongated slab which issues continuously from the machine and may be cut into suitable lengths.—A.P.-C.

Impregnating Roofing Felt with Asphalt. Charles L. Keller, assignor to The Richardson Co. U. S. pat. 1,754,024, April 8. 1930.—The principle of the invention lies in applying hot asphalt to one side of the sheet so that, as it penetrates into the latter, it displaces the moisture. This is carried out by passing the felt containing preferably 25 per cent to 50 per cent water around a number of rolls heated by a steam about 250° to 300°F., and delivering asphalt heated to about 400°F. into the space between the sheet and the roll just before the sheet comes into contact with the roll.—A.P.-C.

Method of and Apparatus for Making Strip Shingles. Frederick C. Overbury assignor to The Patent and Licensing Corp. U. S. pat. 1,765,800, June 24, 1930.—In order that the cut edges of strip shingles exposed to the weather may be properly sealed the slotting and cutting of the impregnated roofing is effected while the asphalt is still fluid so that it can spread to and cover the cut or slotted edges.—A.P.-C.

Method of and Apparatus for Saturating Sheet Material by Calenders. William G. Dudleston, assignor to The Patent and Licensing Corp. U. S. pat. 1,762,329, June 10, 1930.—The sheet is first passed through a calender stack, liquid saturant being flowed on the face of the sheet immediately prior to its passage between each pair of the rolls so that the saturant is pressed into the sheet. This is followed by passing the sheet through a stack of rolls which are supported with sufficient clearance to permit the passage of the sheet and a layer of saturant, and following the saturant on the sheet as it comes into contact with each roll. The saturating action can be made more effective by suitable temperature control.—A.P.-C.

The Determination of the Alpha Cellulose Content and Copper Number of Paper*

By John O. Burton and Royal H. Rasch[1]

Abstract

In determining the permanence of a paper it is important to know the purity of the cellulose composing it. The tests most commonly used for the determination of the purity of cellulosic materials are the alpha cellulose and copper number tests. The alpha cellulose test is based upon the assumption that unmodified cellulose is insoluble in a mercerizing caustic solution. This insoluble portion is termed "alpha cellulose." The copper number test is based upon the quantitative reduction of an alkaline copper solution by the degraded celluloses of the sample. The copper number is the weight of copper so reduced by a definite weight of the sample.

Both of these tests have been highly developed for the analysis of cellulosic materials in a loose, fibrous form, such as paper pulp. But the fibers of paper are packed into a dense, compact sheet and hence methods which can be applied to other forms of cellulose cannot be applied to paper. Also, papers contain several non-cellulosic constitutuents which must be taken into account. Methods which have been proved reliable for the analysis of other forms of cellulosic materials have been modified by the Bureau to make them applicable to paper testing. The modification considered of prime importance is the reduction of the sample to a cotton-like form by means of mechanical disintegration. It is also important to correct the results for the amounts of sizing and loading materials in the paper. Several minor details of the methods have been altered for purposes of simplicity and increased accuracy. By the use of the alpha cellulose method duplicate determinations of the percentage of alpha cellulose agree within 0.3. Duplicate results obtained with the copper number method seldom vary more than 1.0 per cent from their mean.

I. Introduction

The determinations of the alpha cellulose content and copper number are used to a considerable extent in evaluating the purity of cellulose materials. The alpha cellulose content of a cellulosic material is that part which is insoluble in a sodium hydroxide solution of mercerizing strength under certain specified conditions. The copper number is the weight of copper, in grams, reduced as cuprous oxide from an alkaline copper solution by a given amount of the cellulosic material. The purer forms of cellulose are characterized by a high content of alpha cellulose and a low copper number. The alpha cellulose content is regarded as the amount of unmodified cellulose which the material contains. The remainder of the cellulose material may be composed of several substances, such as naturally occurring waxes and resins, lignin, pentosans, and modified forms of cellulose, but the chief constituents are the modified forms of cellulose. These modified celluloses are characterized by their power to reduce copper from alkaline copper solutions. The quantity of copper which they will reduce depends upon their amount and the extent to which they have been modified. Thus the copper number arises from these modified forms of cellulose and simultaneously measures their amount and degree of modification.

These determinations are used as a matter of routine procedure in testing the raw cellulose materials, such as cotton and wood fibers, used in the manufacture of rayon, lacquers, guncotton and other cellulose products. The viscose industry has long realized the close connection between the purity of the cellulose materials and the quality of the product. There is without doubt a similar relation in the manufacture of paper. The stability of paper, and in many cases its strength, appears to be directly related to its cellulosic purity as measured in terms of alpha cellulose and copper number. The use of these determinations for judging the quality of fibrous raw materials used for papermaking and for testing the probable permanence of papers is rapidly increasing. As the cellulose of paper-making fibers is usually degraded to some extent in the paper-making process, such as by oxidation or hydration in the cooking, bleaching and beating, determinations of alpha cellulose and copper number are also used to some extent as control tests. As these modified celluloses are considered to be quite impermanent and a possible cause of deterioration, it is important to know not only the content of unmodified cellulose in a paper or a paper-making material, but also to know the degree of the modification as expressed by the copper number.

In its research on the permanence of paper the Bureau of Standards makes extensive use of the alpha cellulose and copper number determinations. In the course of this work the methods described in the literature for these determinations were found unsuitable for the analysis of paper, having been designed more particularly for soft, readily-absorbent materials such as are used for viscose products. They could not be successfully applied to more compact and resistant materials such as paper and certain paper-making fibers.

Experimental study of the methods available resulted in the development of modified testing procedures which appear to be more satisfactory for the analysis of paper and paper-making fibers. Following are descriptions of the modified methods as they are now being used by the Bureau, and of the experimental studies made in connection with their development.

II. Preparation of the Sample

The basic constituent of papers is cellulose, but in a determination of their chemical properties they differ markedly from most other cellulosic materials in that the fibers are closely packed into a dense, compact sheet and are protected from the action of chemical agents by a covering of rosin. For this reason the Bureau has adopted the sugestion of Kohler and Hall[2] and for chemical determinations such as these, reduces all paper to a uniform fibrous condition by the use of a grinder.

The grinder used was designed by Gosta Hall and is similar to the one used at the Swedish Government Testing Institute. (See Figs. 1 and 2.) Several of these grinders are in use in this country and abroad. The grinder consists of a 12-inch rotor revolving inside a steel housing at a speed of 1700 revolutions per minute. The rotor is fitted with 6 serrated steel lugs and the inner circumference of the steel housing is also serrated. The rotor teeth clear those of the housing by a sixteenth of an inch. The paper is introduced in the form of one-half-inch strips through a hopper and is then carried by centrifugal force to the space between the rotor teeth and those of the steel housing where it is disintegrated. The cotton-like material thus formed is ejected through a 10-mesh wire screen and collected in a receptacle in the base of the apparatus. This method of grinding possesses the advantages of rapidity, and absence of a noticeable rise in temperature and of contamination. Most of the grinding is done by impact, the paper being thrown against the teeth of the steel housing with sufficient force for dis-

* Published by permission of the Director of the Bureau of Standards of the U. S. Department of Commerce, Washington, D. C. Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 17-19, 1931.
Contribution of the Paper Testing Committee.
[1] Research Associate of the Brown Company, Berlin, N. H.

disintegration. Thus there is no sustained action on the fibers and excessive bruising and crushing are avoided.

The disintegrated paper is spread loosely in trays and allowed to attain equilibrium with the moisture of the atmosphere in the vicinity of the balance upon which the sample is to be weighed. Samples should be exposed to this atmosphere for at least six hours. This procedure has been found to be superior to conditioning the sample in a closed container as in many cases the relative humidity of the atmosphere in the container and that of the atmosphere in which the sample must be weighed differ sufficiently to cause the sample to continually change in weight during the weighing. A constant temperature and humidity room in which weighings can be made is very useful for conditioning samples.

Papers containing sizing or loading materials must be analyzed for the amounts of these materials, as the results are based on the weight of the fibrous material in the paper and not on the weight of the paper itself. The analysis of the paper for sizing materials may be made on either the sheet or disintegrated form of the sample. The analysis for loading materials should be made on the disintegrated paper, as the amount of loading materials in this form may differ from the amount in the original paper because of loss during the grinding operation. The grinding tends to free the filler from the fibers so that it is rather loosely held. Although some of the filler is usually lost, that which is retained by the fibers will remain quite uniformly distributed throughout the sample if care is taken to avoid excessive shaking and handling of the disintegrated paper. This is true if the filler content is less than about 12 per cent. If it is greater than this it may be difficult to obtain a uniform sample. The moisture content of the sample is also determined. The analyses for sizing materials, filler and moisture are made by the methods of the Technical Association of the Pulp and Paper Industry.[3]

The weights of the samples used in the alpha cellulose and copper number determinations are corrected for moisture content, ash and sizing materials and the results are calculated on this corrected weight. Table IV shows the magnitude of the correction for the sizing materials in the sample.

III. The Determination of the Alpha Cellulose Content of Paper

1. Definition of Alpha Cellulose and Origin of the Method

By alpha cellulose is meant that part of cellulosic materials which is insoluble in a solution of sodium hydroxide of mercerizing strength under definite conditions for a definite time. Cross and Bevan[4] first mentioned the analytical use of mercerizing caustic for the isolation of "normal cellulose." Data were later produced to show that no so-called pure cellulose was entirely insoluble in mercerizing caustic but the principle used by Cross and Bevan for isolating normal cellulose was found to be applicable to the testing of cellulosic materials for unmodified cellulose or "alpha cellulose." Many methods have been devised for the determination of alpha cellulose but the one most commonly used is that of Jentgen[5] or some modification thereof. The method described here is based on that of Jentgen and modifications of his method suggested by Parsons[6] and Ross.[7]

[2] Kohler and Hall. Acidity in Paper. The Paper Industry, 7, No. 7, October, 1925.
[3] Paper Testing Methods, published for the Technical Association of the Pulp and Paper Industry. New York, Lockwood Trade Journal Co. 1928.

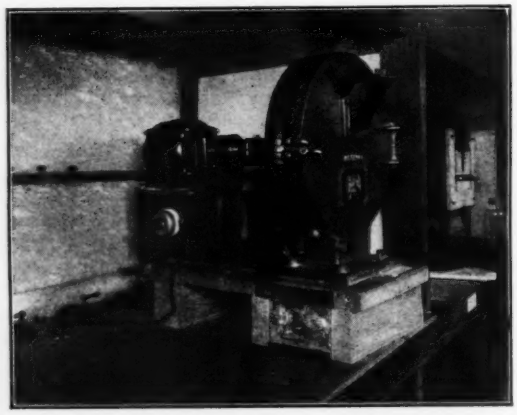


Fig. 1
View of paper grinder showing general construction.

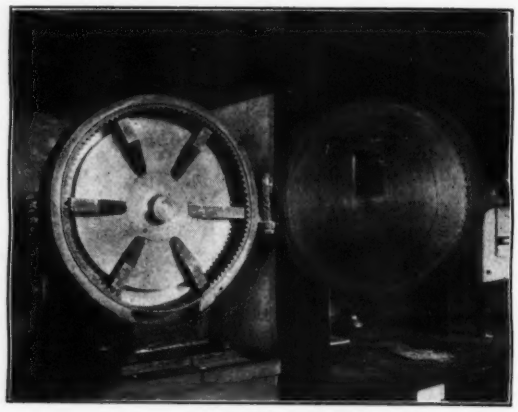


Fig. 2
View of paper grinder showing construction of grinding parts.

2. Preparation of the Mercerizing Solution

The mercerizing solution consists of an aqueous solution of sodium hydroxide (C.P. grade) containing 17.5 per cent sodium hydroxide by weight, having a specific gravity of 1.197 at 15 deg. C. The C.P. grade of sodium hydroxide usually contains 1 to 2 per cent sodium carbonate which must be removed. This is accomplished according to directions given by Clark.[8] The required weight of sodium hydroxide sticks is dissolved in an equal weight of water and the solution allowed to stand in a closed vessel for several days, during which time the sodium carbonate will precipitate. The solution is filtered through a thick mat of asbestos or a hardened filter paper and diluted to the correct concentration with distilled water which has been recently boiled to expel carbon dioxide. Care must be taken when handling the solution that it is exposed to the atmosphere as little as possible to prevent the absorption of carbon dioxide.

3. Procedure

Weigh accurately approximately 5 grams of the sample, prepared in the manner previously described, in a weighing bottle. Calculate the corrected weight of sample by subtracting from the original air-dry weight the weights of moisture, ash and sizing materials. Transfer the accurately weighed sample to a 400 ml beaker of resistant glass such as Pyrex and place the beaker in a constant temperature bath at 20 deg. C. After the beaker has attained the temperature of the bath add by means of a pipette, 50 ml of the sodium hydroxide solution, the temperature of which has been adjusted to 20 deg. C. Note the time immediately after the addition of the mercerizing solution. Macerate the sample well with a flattened glass stirring rod. Add another 50 ml portion of the sodium hydroxide solution and repeat the maceration. Allow the solution to stand for 30 minutes from the time of the first addition of caustic soda solution. In the meantime fit a filter flask with a

[4] Cross and Bevan. Researches on Cellulose, Vol. III, p. 22; 1905-10.
[5] Jentgen. Kunststoffe, 1, p. 165; 1911.
[6] Parsons. Paper Trade Journal, 82, No. 8, p. 211 (Technical Section, p. 105); 1926.
[7] Ross. Research Notes, Canadian Pulp and Paper Association, 1, pp. 37-57; 1926.
[8] Clark. The Determination of Hydrogen Ions. Baltimore, The Williams and Wilkens Co. p. 195; 1928.

7.5 cm. Büchner funnel containing a circular piece of cloth as a filtering medium. Use a high grade cotton cloth of fine texture for this purpose. Nainsook has been found to be satisfactory. Dry the cloth in an oven at 105 deg. C. until the weight is constant and record the dry weight.

At the end of the 30-minute period dilute the contents of the beaker with 250 ml of distilled water and filter through the cloth, using mild suction. Pack the mat thus formed with the stirring rod and wash with an additional 125 ml of distilled water. Return the filtrate to the mat and refilter to retain any fine fibers which may have passed through when the mat was first formed. Then wash with 625 ml of distilled water added in small portions, packing the mat occasionally to prevent the formation of a channel around its edges. All of the wash water is used at 20 deg. C. After the washing disconnect the suction and add 100 ml of 20 per cent acetic acid, allowing it to soak through the mat for 5 minutes. Remove the acetic acid by means of suction and complete the washing with 1 liter of boiling distilled water, added in small portions. Place the mat and filter cloth on a watchglass or Petri dish and dry at 50-60 deg. C. until most of the moisture has been removed. Then transfer them to a glass-stoppered weighing bottle and dry to constant weight at 105 deg. C.

If no filler were present in the paper this weight less that of the filter cloth would be the weight of the alpha cellulose. If the paper contained filler, determine the amount retained in the alpha cellulose residue by igniting the residue and weighing the ash. The ignition is carried out in the manner described in the method of the Technical Association of the Pulp and Paper Industry for the quantitative determination of filler in paper.[9] Subtract the weight of the ash from the weight of the alpha cellulose residue. The alpha cellulose is reported as the percentage of the corrected weight of the sample.

4. Discussion of the Method

In common with all other test methods, the value of a method for determining the alpha cellulose content of a material depends upon the accuracy and reproducibility of the measurements. Also, because of the use of the determination as a control test in several industries where a large number of samples must be analyzed, the analysis should be as simple and rapid as possible.

The accuracy of the method is difficult to determine because of the empirical and arbitrary definition of alpha cellulose. As was stated before, alpha cellulose is that part of cellulosic materials which resists the action of mercerizing caustic under definite conditions for a specified time. With a definition such as this the only criterion of accuracy appears to be reproducibility. If the conditions specified in the definition are fulfilled in every detail and the results of an analysis can be duplicated, those results are, by definition, the accurate value of the alpha cellulose content of the material. Thus providing the details of the procedure are followed, the value of the method is determined by the reproducibility of the results. It may be seen from Table I that consistent results are obtained by the use of this method. Two analysts were able to duplicate their own and each other's results satisfactorily on a wide variety of papers. These papers were representative of several of the more common paper-making fibers. Some were sized with rosin, some with both glue and rosin, while others were unsized. Sample 6 contained 8 per cent of clay filler. Sample 1, an unsized paper made in the Bureau mill from new unbleached cotton rags, which were a quite pure form of cellulose, had an alpha cellulose content commensurate with its purity.

The method is quite rapid. Two determinations on a given sample may be made in parallel. The mercerizing solution may be added to the next two samples during the 5-minute immersion of the first two in acetic acid. This procedure may be repeated, thus completing two determinations about every 45 minutes, exclusive of the time required for the weighing and drying operations. The method is quite simple, but close attention to detail is required throughout the analysis. This is especially true of the control of the temperature.

Several details of the method were investigated. One of these was the effect of mechanical grinding upon the value obtained for the alpha cellulose content. The data in Table II show that the determined value of the alpha cellulose content of a paper is dependent upon the form in which the paper is analyzed, ½-inch squares giving a higher value than is obtained when the paper is disintegrated. This difference is found in all papers but it is not constant for all, being less for the softer papers. Providing the sample is disintegrated without heating this difference may be due to the difference in the amount of surface exposed in the two cases. When the paper is analyzed in the ground form the measured value of the alpha cellulose content may be low because of reduced particle size and consequent increased rate of solution in the alkali; and when the squares are used, the measured value may be high because of incomplete reaction with the alkali. Photomicrographs of rag and wood fibers after being subjected to the action of the grinder showed that the fibers were well separated from one another but that there was no excessive crushing and breaking of the fibers. (See Figs. 3, 4, 5 and 6). On the other hand the data given in Table II show that the incomplete reaction of the alkali with the sample in the form of cut squares is the cause of the difference.

If incomplete reaction between the cellulose and alkali were the cause, the difference between the measured alpha cellulose contents of samples in the form of squares and in the ground form should increase as the hardness of the paper increases. This point was investigated by making by hand papers of varying degrees of hardness from three kinds of pulps. The beating process results in the formation of a gelatinous form of the cellulose material which, when dried, imparts to the finished paper such properties as resistance to liquids, increased density, smoother texture and other properties usually associated with hardness in paper. As continued beating results in greater hardness, varying the length of the beating period is a convenient method of obtaining papers of different degrees of hardness from the same stock. The three kinds of fibers, kraft, sulphite and highly purified wood fiber, were beaten in a 2-pound beater until they they were well hydrated. Samples were removed from the beater at four different intervals—before any appreciable hydration had taken place, twice during the beating, and at the end of the beating period—and made into handsheets on a sheet mold.[10] Thus papers of varying degrees of hardness were obtained from each kind of fiber, the hardness increasing with the time of beating.

[9] See footnote 3.

TABLE I
ACCURACY AND REPRODUCIBILITY OF THE ALPHA CELLULOSE METHOD

Sample No.	Fiber composition, per cent	Sizing material	Analyst No. 1: Alpha cellulose, per cent	Analyst No. 1: Average, per cent	Analyst No. 1: Difference, per cent	Analyst No. 2: Alpha cellulose, per cent	Analyst No. 2: Average, per cent	Analyst No. 2: Difference, per cent	Difference between analysts, per cent
1	100 Rag	Unsized	98.26 98.17	98.21	0.09	97.97 98.21	98.09	0.24	0.12
2	100 Rag	Rosin and glue	89.15 89.23	89.19	0.08	89.46 89.23	89.34	0.23	0.15
3	100 Purified wood fiber	Unsized	91.65 91.82	91.74	0.17	92.20 92.05	92.12	0.15	0.38
4	100 Purified wood fiber	Rosin and glue	88.14 88.43	88.29	0.29	88.34 88.57	88.45	0.23	0.16
5	100 Sulphite	Rosin	80.21 80.23	80.22	0.02	79.87 80.14	80.00	0.27	0.22
6[1]	40 Sulphite 60 Soda	Rosin	65.33 65.30	65.32	0.03	66.03 66.06	66.04	0.03	0.72
Average					0.11			0.19	0.29

[1] This paper contained clay filler.

[10] The Preparation of Fiber Test Sheets, by M. B. Shaw, G. W. Bicking, and L. W. Snyder. Bureau of Standards Journal of Research, Research Paper No. 190, 5, pp. 105-114; July, 1930.

Each set was divided into two lots, one lot being cut in to ½-inch squares and the other being mechanically disintegrated. An alpha cellulose determination was then made on all of the sets of hand sheets in the two forms. The results are given in Table II.

TABLE II
EFFECT OF THE HARDNESS AND THE FORM OF THE PAPER ON THE ALPHA CELLULOSE DETERMINATION

Sample [1]	Time of beating Hours	Alpha cellulose content: ½-inch squares Per cent	Alpha cellulose content: Disintegrated Per cent	Difference Per cent
Kraft sulphate wood fiber				
A	0	89.13	87.66	1.47
B	2¼	89.55	87.66	1.89
C	4¼	89.80	87.39	2.41
D	7¼	89.57	87.20	2.37
Sulphite wood fiber				
A	0	84.26	81.80	2.46
B	2¼	86.08	80.35	5.69
C	4¼	87.99	80.19	7.80
D	6¼	88.77	80.21	8.56
Highly-purified wood fiber				
A	0	93.71	91.38	2.33
B	2½	94.39	90.70	3.69
C	5	94.81	90.75	4.06
D	7½	95.25	90.67	4.58

[1] The sample designations of A, B, C and D refer to the same stock beaten different lengths of time as indicated.

These results show that as the hardness of the paper increases the difference between the values obtained as the alpha cellulose contents of the two forms of the sample increases. The measured value of the alpha cellulose content of the paper in the ground form changes very little as the hardness of the paper increases. This change is toward a decrease of the value of the alpha cellulose content, and probably results from chemical changes in the fiber during the beating process. On the other hand, the value obtained for the alpha cellulose content of the paper in the form of squares increases to a marked extent as the paper increases in hardness. This large increase could hardly be ascribed to any other cause than incomplete reaction of the reagents with the paper. Inasmuch as the fibers of most papers are hydrated to some extent, and as the hardness and resistance to liquids are further increased by engine and surface sizing, these data show that papers must be reduced to a fibrous condition by some such means as grinding to insure maximum reaction in the alpha cellulose determination.

FIG. 3
Fibers from rag paper before disintegration.

FIG. 4
Fibers from rag paper after disintegration.

A grinder similar to the one described under "Preparation of the Sample" is recommended. However, there are several forms of grinders in use and any of them which will reduce the paper to a fibrous condition without the formation of lumps, without heating the paper, and without excessively bruising and crushing the fibers should be satisfactory.

The solubility of the nainsook filter cloth in the alkali was investigated. In the alpha cellulose determination the 100 ml of 17.5 per cent sodium hydroxide used for the mercerization are diluted with 250 ml of water before the mixture is filtered. Thus the concentration of the strongest alkali coming in contact with the filter cloth is about 5.7 per cent. Alkali of this concentration is in contact with the filter cloth for a few minutes only. To find the change of the weight of the filter cloth during a determination, a piece of the nainsook of the size used in the determination was thoroughly washed with warm water and dried to constant weight at 105 deg. C. It was then treated for 10 minutes with 6 per cent sodium hydroxide solution at 20 deg. C. The cloth and alkali were thrown on a Büchner funnel and the cloth washed with 750 ml of water at 20 deg C., then allowed to soak in 25 per cent acetic acid for 5 minutes, and finally washed with 1 liter of boiling distilled water. The cloth was then dried in an oven at 105 deg. C. to constant weight. The original weight of the cloth, the weight after this treatment, and the difference between the weights are given in Table III. The change in weight is the solubility of the cloth under these conditions. A and B refer to two different samples of nainsook. The solubility of B is higher than that of A, showing that different samples vary. For this reason it is recommended that the cloth be analyzed, as outlined here, before it is used, and that a cloth having a solubility approximately that of A be selected. If a cloth such as A were used an error of about 0.03 per cent, based upon a 4-gram alpha cellulose residue, would be introduced into the alpha cellulose determination. An error of this magnitude may be neglected.

TABLE III
CHANGE OF THE WEIGHT OF THE FILTER CLOTH DURING THE ALPHA CELLULOSE DETERMINATION

Sample No. [1]	Weight of the cloth before treatment	Weight of the cloth after treatment	Change of the weight of the cloth during the treatment
	g.	g.	g.
A1	0.3174	0.3161	0.0013
A2	0.3172	0.3160	0.0012
A3	0.3123	0.3107	0.0016
B1	0.2806	0.2772	0.0034
B2	0.2742	0.2706	0.0036
B3	0.2778	0.2751	0.0027

[1] Samples A and B were two different pieces of nainsook. Three analyses of each were made.

To make the value obtained for the alpha cellulose content independent of the amount of sizing and filling materials, it is necessary to correct the weight of the sample analyzed by subtracting the weights of these materials which the sample contains. The difference between the value of the alpha cellulose content obtained when corrections are made for these materials and the value obtained when they are disregarded is given in the eighth column of Table IV. This difference is appreciable and shows that the basis of calculation of the alpha cellulose content should be the weight of the fibrous material in the paper and not the weight of the paper itself. If the weight of the paper is used as the basis of calculation the measured alpha cellulose content will vary as the amount of filler and sizing material in the paper varies. When the calculation of the alpha cellulose content is made in this manner the assumption is made that the sizing materials are completely removed by the reagents. This assumption is not strictly valid, as the data in Table IV show that small amounts of rosin and glue remain in the alpha cellulose residues. The difference between the calculated value of the alpha cellulose content when the weight of the residue is corrected for the sizing materials it contains and the value calculated when they are disregarded is given in the last column of Table IV. This difference is small, varies but slightly among the different samples, and for most purposes may be neglected. If a high degree of accuracy is desired, the residues may be analyzed for sizing materials and the corrections applied. However, the alpha cellulose residues of loaded papers must always be analyzed for mineral matter and the weights of the residues corrected, owing to the large amount of loading material present in the residues.

FIG. 5
Fibers from sulphite paper before disintegration.

FIG. 6
Fibers from sulphite paper after disintegration.

In 1929, the Cellulose Division of the American Chemical Society published a tentative standard method for the determination of alpha cellulose[11] This method gives very satisfactory results when applied to pulps but it is unsuitable for the anlaysis of papers because of the form in which the sample is used. This method comes from an authoritative source, and will probably be used to a large extent by cellulose investigators. There will, therefore, be many instances when it will be necessary to compare the results obtained by the use of the American Chemical Society method with those obtained by the use of a more specialized method, such as the one described in this article for the analysis of papers, and it is desirable that the two methods give results in close agreement. The greatest difference between the Bureau procedure and that

[11] Determination of Alpha-Cellulose. Report of Work of Sub-committee 2 of the Division of Cellulose Chemistry of the American Chemical Society, George J. Ritter, Chairman. Ind. and Eng. Chem., Analytical Section, 1 p. 52; 1929.

TABLE IV
DATA SHOWING MAGNITUDE OF CORRECTIONS FOR SIZING MATERIALS IN PAPERS AND IN ALPHA CELLULOSE RESIDUES FROM THEM

Sample No.	Rosin in sample, per cent	Glue in sample, per cent	Rosin[1] in alpha cellulose residues, per cent	Glue[2] in alpha cellulose residues, per cent	Alpha cellulose content: Not corrected for sizing materials in sample or residue, per cent	Alpha cellulose content: Corrected for sizing materials in sample but not in residue, per cent	Alpha cellulose content: Difference due to correction for sizing materials in sample, per cent	Alpha cellulose content: Corrected for sizing materials in sample and residue, per cent.	Alpha cellulose content: Difference due to corrections for sizing in residue, per cent
2	2.50	3.68	0.11	0.16	83.78	89.34	5.56	89.06	0.28
4	1.20	2.19	0.08	0.16	85.44	88.45	3.01	88.19	0.26
5	1.70	...	0.10	...	78.63	80.00	1.37	79.68	0.32

[1], [2] Percentages of rosin and glue in the alpha cellulose residues were calculated on the oven-dry weight of the sample before mercerization.

recommended by the American Chemical Society is the difference in the form of the sample. The American Chemical Society method specifies that the material be analyzed in the form of ½-inch squares, whereas the Bureau method specifies that the material be reduced to a fibrous condition before analysis for reasons previously discussed. Otherwise the differences between the two methods are slight. The ratio of alkali to sample in the two methods does not differ sufficiently to cause much difference in the results. The mercerization periods differ, being 30 minutes in the Bureau procedure and 45 minutes in the American Chemical Society method. Most methods have a 30-minute mercerization period and this time was chosen for the Bureau procedure so that it would conform as far as practicable with the existing methods. In developing the American Chemical Society method the committee at first suggested a period of 30 minutes but later changed this to 45 minutes in order to allow more time for the maceration of troublesome materials. Such difficulties are not encountered when the Bureau procedure is used, as all materials macerate readily after being ground. The greater length of the mercerization period of the American Chemical Society method should not cause any considerable difference in the results obtained with it and those obtained with the Bureau method, but the time required for a determination is somewhat longer. The methods of filtering used in the two procedures differ, but both are rapid and efficient and should cause no difference in the results. The method used in the Bureau procedure, filtering through a fine cotton cloth on a Büchner funnel, is the more rapid of the two. The removal of the alkali is accomplished in much the same manner in the two methods. Both specify that water at 20 deg. C. shall be used and that the mat shall soak in dilute acetic acid for 5 minutes. The volume and concentration of the acetic acid are greater in the Bureau method, but this should cause no difference in the results. The method for the removal of the acetic acid used in the Bureau procedure, washing with 1 liter of boiling water, is as efficient as the method used in the American Chemical Society procedure, washing with water at 20 deg. C. until the filtrate is no longer acid to litmus, and is much less time consuming. A comparison of the results obtained with the two methods is given in Table V. One variation was made in the American Chemical Society method in that the sample was ground before use. Otherwise the two methods were followed in detail. The data in Table V show that results obtained by the two methods agree very well when the determinations are made on ground samples. The Bureau method, however, is somewhat more simple and more rapid than the American Chemical Society method.

The Bureau procedure is equally applicable to the analysis of pulps, although designed primarily for paper testing. If pulps are to be analyzed the sample should be ground in the same manner as are papers, if the alpha cellulose contents of pulps and papers made therefrom are to be compared.

IV. The Determination of the Copper Number of Paper

1. Definition of the Copper Number and Origin of the Method

The copper number is defined as the number of grams of copper in the cuprous oxide precipitated from an alkaline solution of cupric hydroxide under certain specified conditions by 100 grams of cellulose material. The method for the determination of the reducing action of cellulose materials on alkaline copper solutions was originated by Schwalbe[12]. His method employed Fehling solution and the reduced copper was determined electrolytically after being dissolved in nitric acid. Later this method was modified to include a correction for the bivalent copper absorbed by the cellulose and to exclude as far as possible the correction necessary for the auto-reduction of the Fehling solution.[13] To avoid the correction for the bivalent copper absorbed by the cellulose Hagglund[14], and Knecht and Thompson[15] further modified Schwalbe's method by determining the reduced copper directly. The reduced copper is dissolved in an acidified solution of ferric alum and the copper determined by oxidizing the resulting ferrous solution back to the ferric state by means of standardized potassium permanganate. Staud and Gray[16] stated that the auto-reduction of the Fehling solution can be reduced to a negligible amount and that a minimum blank is obtainable if certain proportions of the copper Sulphate and alkaline tartrate solutions are used. They also studied the effect of time and temperature of heating and proposed a modification of the Schwalbe method which has found wide applicability. Later Scribner and Brode[17] developed modifications especially applicable to the determination of the copper number of paper using a modification of the Staud and Gray method for reducing the solution and the method of Gault and Mukerji[18] for determining the precipitated cuprous oxide. They also subjected the sample to mechanical grinding in order to obtain uniform reaction.

All of the methods described above employ Fehling solution as the copper-containing reagent, all are subject to the inaccuracy caused by the auto-reduction of the solutions and all involve great care and skill to reduce this to a minimum. In 1921 Braidy[19] and Koehler and Marqueyrol[20], described a method in which the alkalinity of the solution is obtained by the use of a sodium carbonate-sodium bicarbonate solution instead of the alkaline tartrate. The lower alkalinity of this solution is designed to prevent the alteration of the cellulose and auto-reduction of the solution. Clibbens and Geake[21] thoroughly investigated this method and found it to be very satisfactory in determining the extent of oxidation of cotton by acids and oxidizing agents. They recommended its use because of the almost negligible blank obtained on the reagents, because of its accuracy and the reproducibility of the results and because the solution is less alkaline than Fehling solution and is, therefore less likely to alter the reducing substances in the cellulose.

After the work of Scribner and Brode in 1927, the Bureau of Standards employed their method for the determination of the copper number of papers. The method was used for some time but considerable trouble was experienced with the auto-reduction of the solution and in duplicating results. (See Tables VI and VII). Various means were tried to avoid these difficulties, such as using carefully purified reagents, agitating the reaction mixture in various ways during the heating, and using carefully regulated temperature baths. Although some of these were advantageous there was still an appreciable blank determination and the desired accuracy could not always be obtained. It was finally decided to use the method of Braidy.

This method has been successfully adapted, with a few minor modifications, to the determination of the copper number of paper. The method is thoroughly described by the authors and by Clibbens and Geake[22], but will be repeated here. The cuprous oxide is determined by the method of Gault and Mukerji.[23]

TABLE V

COMPARISON OF THE BUREAU OF STANDARDS METHOD WITH THE TENTATIVE METHOD OF THE AMERICAN CHEMICAL SOCIETY

	B. of S. method			A. C. S. method			
Sample No.	Alpha cellulose Per cent	Average Per cent	Variation Per cent	Alpha cellulose Per cent	Average Per cent	Variation Per cent	Difference between methods Per cent
11	98.43 98.25	98.34	0.18	98.54 98.44	98.49	0.10	0.15
12	90.70 90.82	90.76	0.12	90.51 90.74	90.63	0.23	0.13
13	90.71 90.77	90.74	0.06	90.67 90.71	90.69	0.04	0.05
14	85.30 85.11	85.21	0.19	84.83 84.98	84.91	0.15	0.30

[12] Schwalbe. Ber., *40*, p. 4523; 1907.
[13] Schwalbe, Robinoff and Schulze, in Robinoff's Dissertation, Darmstadt. 1912, and Schulze's Dissertation, Darmstadt, 1910.
[14] Hägglund. Papierfabrikant, *17*, p. 301; 1919.
[15] Knecht and Thompson. J. Soc. Dyers and Colorists, *36*, p. 255; 1920.
[16] Staud and Gray. Ind. and Eng. Chem., *17*, p. 741; 1925.
[17] Scribner and Brode. Tech. Papers of the Bureau of Standards, Vol. 22, No. 354; 1927.
[18] Gault and Mukerji. Comp. rend., *178*, p. 711; 1924.
[19] Braidy. Rev. gén. Mat. Col., *25*, p. 35; 1921.
[20] Koehler and Marqueyrole. Mém. Poudres, *18*, p. 73; 1921.
[21] Clibbens and Keake. Jour. Textile Inst., *15*, p. T31; 1924.
[22] See footnote 21.
[23] See footnote 18.

2. Preparation of the Solutions

The alkaline copper solution is made up in two parts which are mixed just before use:

Solution A

Copper sulphate ($CuSO_4.5H_2O$) .....100 g
Distilled water, make up to 1 liter

Solution B

Sodium bicarbonate ..... 50 g
Sodium carbonate ($Na_2CO_3.10H_2O$) ..... 350 g
Distilled water, make up to 1 liter

The reagents should be of C. P. grade and the solutions filtered before using.

For the determination of the cuprous oxide a solution of phosphomolybdic acid is used, which is made up as follows:

Sodium molybdate, ($Na_2MoO_4.2H_2O$) ..... 100 g
Phosphoric acid, 83 per cent ..... 75 ml
Sulphuric acid, 95 per cent ..... 275 ml
Distilled water ..... 1750 ml

3. Procedure

Weigh accurately approximately 1.5 g of the paper sample, prepared as described in section II, and place in a 125 ml Pyrex Erlenmeyer flask. Run 5.0 ml of solution A from a burette into 95 ml of solution B, shake well and bring the mixture to a boil. Pour the boiling solution over the sample and stir thoroughly. Stopper the flask with a loosely fitting glass bulb. A flat-topped glass stopper, the stem of which is slightly smaller than the neck of the flask, is suitable for this purpose. Place the flask in a steam bath or some other constant temperature bath at about 100 deg. C. and allow it to remain there three hours. The contents of the flask should be shaken occasionally during this period. At the end of the heating period filter the contents of the flask through a good grade of filter paper having a low porosity[24], using a Büchner funnel and suction. Wash with 100 ml of 5 per cent sodium carbonate solution and then with 250 ml of boiling distilled water. Transfer the fiber and filter paper to a 400 ml beaker, add 25 ml of the phosphomolybdic acid solution and macerate well with a flattened glass rod. Allow the acid to act for a few minutes, then add 100 ml of cold distilled water and filter again on a Büchner funnel with suction. Wash the fiber with distilled water until all of the blue color has been removed. To avoid an excessive volume of wash water, the washing is best accomplished by disconnecting the suction, adding a small volume of water and allowing the fiber to soak in it for a few minutes. This is then removed by means of the suction and the washing repeated with another small volume of water. Titrate the blue filtrate with N/20 potassium permanganate to a faint pink.

TABLE VI
COPPER NUMBER OF PAPERS—DUPLICATE ANALYSES MADE AT DIFFERENT TIMES

Sample No.	Fiber [1] composition	Copper number—Fehling solution method [2] I	II	Average	Per cent deviation from average	Copper number—Braidy method I	II	Average	Per cent deviation from average	Ratio B:F.S.
	Per cent									
Blank	.....	...	...	0.47	..	...	...	0.03	..	..
106-O	100 P.W.F.	1.11	1.08	1.10	1.4	1.30	1.32	1.31	0.8	1.2
106-H	100 P.W.F.	1.22	1.20	1.21	0.8	1.65	1.67	1.66	0.6	1.4
109-O	100 S.	3.13	3.44	3.29	4.8	4.61	4.60	4.61	0.1	1.4
109-H	100 S	3.75	3.94	3.85	2.5	5.08	5.12	5.10	0.4	1.3
118-O	100 R.	0.68	0.78	0.73	6.9	0.82	0.81	0.82	0.6	1.1
119-O	100 R.	0.94	1.02	0.98	4.1	1.23	1.25	1.24	0.8	1.3
119-H	100 R.	1.36	1.42	1.39	2.2	1.71	1.68	1.70	0.9	1.2
120-O	100 R.	0.53	0.62	0.58	7.8	1.07	1.05	1.06	0.9	1.8
120-H	100 R.	0.94	0.94	0.94	0.0	1.32	1.32	1.32	0.0	1.4
126-O	100 R.	0.85	0.90	0.88	2.9	1.13	1.12	1.13	0.5	1.3
126-H	100 R.	1.03	1.20	1.12	7.6	1.56	1.48	1.52	2.6	1.4
127-O	100 R.	0.86	0.66	0.76	13.1 [3]	0.90	0.90	0.90	0.0	1.2
127-H	100 R.	1.39	0.93	1.16	19.8 [3]	1.66	1.70	1.68	1.2	1.4
Average	.....				5.7				0.7	1.3

[1] The fiber composition is denoted as follows: R = rag, P.W.F. = highly purified wood fiber, S = Sulphite wood fiber.
[2] The Fehling solution method was that described by Scribner and Brode. See footnote 17.
[3] Despite the unusually wide deviations it was decided to include these results in the average.

TABLE VII
COPPER NUMBER OF PAPERS—DUPLICATE ANALYSES MADE AT THE SAME TIME

Sample No.	Fiber [1] composition	Copper number—Fehling solution method [2] I	II	Average	Per cent deviation from average	Copper number—Braidy method I	II	Average	Per cent deviation from average	Ratio B:F.S.
	Per cent									
1-O	100 R.	1.77	1.81	1.79	1.1	2.55	2.52	2.53	0.6	1.4
2-O	50 S.-50 So.	2.52	2.25	2.38	5.7	3.24	3.23	3.23	0.2	1.4
3-O	100 R.	1.66	1.54	1.59	4.7	2.10	2.10	2.10	0.0	1.3
4-O	100 S.	3.54	3.53	3.53	0.2	4.56	4.37	4.47	2.1	1.3
5-O	100 S.	2.27	2.19	2.23	1.8	3.02	2.91	2.96	1.9	1.3
6-O	50 R.-50 S.	1.09	1.12	1.11	1.4	2.31	2.31	2.31	0.0	2.1
7-O	100 R.	1.55	1.40	1.47	5.1	1.79	1.81	1.80	0.6	1.2
8-O	100 R.	1.11	1.13	1.12	0.9	1.41	1.39	1.40	0.7	1.3
11-O	40 S.-60 So.	4.04	3.83	3.93	2.6	4.66	4.75	4.70	0.9	1.2
12-O	100 R.	3.53	3.56	3.54	0.4	4.38	4.30	4.34	0.9	1.2
13-O	100 R.	4.32	4.24	4.28	0.9	5.61	5.70	5.65	0.8	1.3
14-O	100 R.	2.19	2.08	2.13	2.6	2.54	2.55	2.55	0.2	1.2
Average	.....				2.3				0.7	1.3

[1] The fiber composition is denoted as follows: R = Rag; S = Sulphite wood fiber; So = Soda wood fiber.
[2] The Fehling solution method was that described by Scribner and Brode. See footnote 17.

The copper number may be calculated from the following formula:

$$\text{Copper number} = \frac{6.357 \times (\text{total ml } KMnO_4 - \text{ml } KMnO_4 \text{ for blank}) \times N}{W}$$

where N is the normality of the potassium permanganate and W is the weight in grams of the sample used after corrections have been applied for non-cellulosic constituents as described in section II. The blank correction is the volume of $KMnO_4$ necessary to color the solution a faint pink.

4. Discussion of the Method

A complete study of the method has been made by Clibbens and Geake. For this reason the work described in this article was limited to a study of the application of the Braidy method to paper analysis and a comparison of the Braidy method with a method employing Fehling solution as the copper containing reagent. The results of the comparison are given in Tables VI and VII. These results show that if duplicate analyses on one sample are made at different times the Braidy method has an average error only ⅛ as large as the method employing Fehling solution. If duplicate analyses are made at the same time the Braidy method has an average error 1/3 as large as the Fehling solution method. The ratios of the Braidy values to the Fehling solution values average approximately 1.3. This ratio has been given values from 1.15 to 1.5 by various investigators. Considering the wide variety of papers studied the ratios agree rather well and as an approximation it may be said that:

Copper number (Braidy method) = 1.3 x Copper number (Fehling solution method).

The results obtained on the papers tested showed no relation between the type of fiber and the value of this ratio.

Three modifications of the Braidy method, as described by Clibbens and Geake, were made so that the method would be more applicable to paper analysis. The form of the sample was not specified by these investigators, doubtless because they were working with raw cotton which may be analyzed in its natural form. A specification for the form in which the sample must be used has been included in the present procedure. A second modification is a change of the weight of the sample from 2.5 grams to 1.5 grams. The third modification is the use of phosphomolybdic acid instead of ferric alum for the determination of the cuprous oxide.

[24] A Whatman No. 42 filter paper is suitable for this purpose.

As was the case in the alpha cellulose determination the greatest departure from the usual methods is the disintegration of the sample. Such a procedure appears to be necessary in the copper number determination for the same reason that it is necessary in the alpha cellulose determination; i.e. to insure complete reaction. The copper numbers of papers in the form of squares are usually lower than those obtained when the paper is disintegrated, although this is not always the case. Jonas[25] recommends the use of beaten cellulose. Other investigators recommend the squares. The copper number depends upon the number of reducing groups in the material and the completeness of the reaction between these groups and the reagents. Therefore, the method of preparation of the sample should be immaterial if it does not alter the number of reducing groups, and if it produces a form of the sample which will insure complete reaction. Grinding the sample as described in Section II, reduces the material to such a condition that it can all be acted upon by the reagents, and if the grinding is done without heating the material the number of reducing groups should remain unaltered. Also, the precipitated cuprous oxide is much more easily removed from a disintegrated sample than it is from hard, compact squares.

The Braidy method, as described by Clibbens and Geake, uses 2.5 grams of sample but in the method described here for the analysis of paper the weight of the sample is changed to 1.5 grams. This is because there is insufficient copper in the volume of solutions used to account for all of the reducing power of some papers when the weight of the sample is 2.5 grams. Clibbens and Geake showed that there was a slight increase in copper number as the weight of the sample was increased. However, as the 2.5 gram sample is an arbitrary weight another arbitrary weight was used which would give the desired range for the method. This is suggested by Clibbens and Geake.

The determination of the cuprous oxide by means of phosphomolybdic acid is used because of the assurance of complete washing by the removal of all of the blue color and because of the very definite end point when the blue solution is titrated with potassium permanganate. The blue color changes from dark blue, to green, to colorless and finally to pink as the potassium permanganate is added. Ferric alum is equally good as an oxidizing agent for the cuprous oxide, but we believe the phosphomolybdic acid is easier to work with. The two give practically the same results, as is shown in Table VIII.

TABLE VIII
COMPARISON OF METHODS FOR DETERMINING THE CUPROUS OXIDE IN THE COPPER NUMBER DETERMINATION

Sample No.	Copper number	
	Phosphomolybdic acid	Ferric alum
Blank	0.03	0.12
1	0.31	0.30
2	0.37	0.38
3	3.75	3.77

A variation of the temperature at which the reduced phosphomolybdic acid is titrated between 10 and 40 deg. C. has no effect on the results. Cuprous oxide was dissolved in 125 ml of the phosphomolybdic acid solution and the solution made up to 250 ml with water in a volumetric flask. 50 ml. portions of this solution were made up to 300 ml with water of different temperatures and titrated with potassium permanganate. The results are given in Table IX.

TABLE IX
EFFECT OF TEMPERATURE ON THE TITRATION IN THE COPPER NUMBER DETERMINATION

Temperature of solution titrated	Titre in ml $KMnO_4$
10 deg. C.	10.34
27 deg. C.	10.36
40 deg. C.	10.32

Clibbens and Geake studied the effect of small changes of the temperature of the reaction upon the copper number. They found that a difference of 1.5 deg. C. caused a difference of 5 to 10 per cent in the copper number. For this reason it is important to control the temperature of the constant temperature bath very carefully. A bath of steam or boiling water is the usual form of constant temperature bath, but the temperature of such a bath varies with the atmospheric pressure, causing a variation in the copper number. For accurate work or when results obtained at different times must be compared, a bath which is not subject to these variations, such as an oil bath with thermostatic control capable of maintaining a temperature constant within ±0.1 deg. C., should be used.

If pure reagents are used no cuprous oxide will be precipitated from them when they are heated for 3 hours at the temperature of the steam bath. This is clearly shown by the fact that no blue color is formed when reagents treated in this manner are filtered and phosphomolybdic acid is added to the filter paper. However, if the phosphomolybdic acid added to the filter paper is washed out and filtered as is done when copper numbers are being determined, the resulting filtrate will require about 0.15 ml of N/20 potassium permanganate to color it a faint pink. This volume of potassium permanganate accounts for the blank correction in the formula given in section IV, part 3.

V. Conclusion

The methods described in this article for the determination of the alpha cellulose content and copper number of paper are the methods now being used at the Bureau of Standards. It is not claimed that they are new, but rather that they are further developments of existing methods designed to make them more suitable for paper testing. While it is recognized that several steps in the procedures might be further investigated to advantage, the methods described herein give results which can be readily duplicated, and they are less time-consuming than the methods formerly used. Grinding the sample, as recommended herein, is particularly important when analyzing paper.

[25] Jonas. Z. angew. Chem., 41, p. 960-961; 1928. Abstracted in The Paper Makers' Monthly Journal, 11, Nov. 15, 1928.

Meeting on Preservation of Records

The Advisory Committee of the National Research Council for the Bureau of Standards Research on Preservation of Records, met at the Bureau of Standards recently, for discussion of the research with the members of the bureau staff directly concerned.

A report of the entire research relating to permanence of paper being conducted at the Bureau of Standards was discussed. The report showed that in cooperation with the Brown Company, thorough tests of the relative permanence of the current commercial writing and printing papers have been completed and that similar papers are being made in the bureau paper mill in further study of the relation of the materials used in their manufacture to their permanence. The status of the work being done in cooperation with the Carnegie Foundation and the National Research Council on the preservation of records in libraries is: an abstract bibliography of the literature is nearing completion; a survey of the record storage conditions in public libraries has been completed; extensive tests of stored publications to find the extent and nature of deteriorative effects have been largly completed; the sensitivity of rosin and iron compounds to light has been further proved; experimental study of effect of atmospheric components has been initiated, considerable progress having been made relative to effect of air polluted with sulfur dioxide; and study of effect of loss of moisture by stored publications is in progress.

The committee members approved the organization of the research and expressed the opinion that satisfactory progress was being made. In connection with the bureau findings that purification of air and maintenance of uniform temperature and humidity are desirable for the preservation of stored records, Mr. H. M. Lydenberg, Assistant Director, New York Public Library, expressed the opinion that it was doubtful if such practice would be generally put into effect in public libraries. In view of this, it was agreed to include studies to find means of making paper more resistant to external deteriorating agents.

POWER PLANT SECTION

REDUCING POWER COSTS THROUGH UNIT TREATMENT

Conducted by **Reginald Trautschold Consulting Engineer**

Water in Paper Making*

Purification and Conditioning

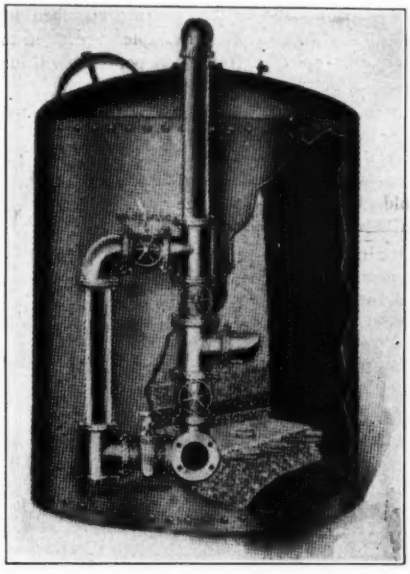
A satisfactory, reasonably pure, water supply makes a whiter sheet, reduces the number of spects and materially prolongs the life of the felts and wires used in paper making. It is an absolute necessity where the production of white, quality papers is concerned, or where accurate color shade matching is essential, and, on account of the increased felt life, is an important economy in the manufacture of low-grade papers as well. In the power plant, for the generation of steam, the character and quality of the water employed are of like importance, so that the purification of the water supply and the suitable conditioning of the water for mill and steam plant use are questions which concern virtually every paper making establishment, in that they are considerations which intimately effect the mills' balance sheets.

Water in Paper Making[1]

"Of course, clear water is universally used by paper manufacturers, but clear water often means little more than water from which visible particles simply have been removed. A filter plant may be employed, it is true, but little more is asked of the plant than to remove the leaves and twigs, the finely divided suspended matter, color pigment, growths and often deleterious chemicals being allowed to pass through the filters and into the effluent. Just such a situation is very much more common than would be expected.

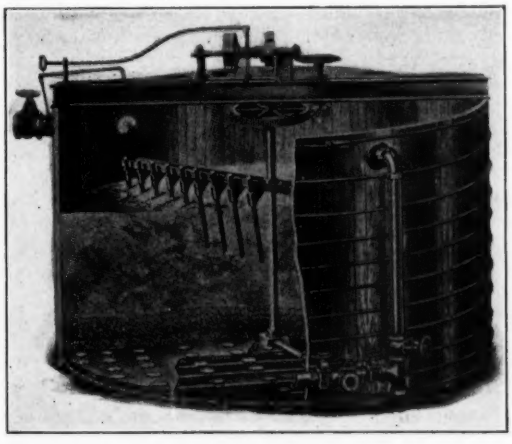
"The most objectionable elements in this contamination are the color and growths which are traceable to the presence of vegetation, for the most part. The brownish stain present in so many water supplies is very apt to be attributable to the presence of vegetation and is a powerful dye which can, when developed by certain mordants, seriously effect the color of the paper. If traces of iron are also present in the water, the organic matter and the iron form what is to all intents and purposes a dilute ink which has a more or less affinity for the cellulose.

"Color in water shows its most damaging aspect, naturally, in the manufacture of high grade sized papers. Not only is there more or less direct staining of the paper by the color, but a far more active dyeing process is set up when alum is used to precipitate the size. The alum, unfortunately, precipitates the color as well as the size and freshly precipitated color has a great affinity for cellulose. In fact, all the color in the water is precipitated



Courtesy: Hungerford & Terry, Inc.

FIG. 2.
Vertical type pressure filter.



Courtesy: Hungerford & Terry, Inc.

FIG. 1.
Wash rack type of gravity filter

* For other discussions dealing with filtration and the purification of water and steam see PAPER TRADE JOURNAL, April 5, 1928; Feb. 14, April 11, 1929; Jan. 9, May 15, 1930; and June 25, 1931.

[1] By C. Hungerford, Pres. Hungerford & Terry, Inc., Clayton, N. J.

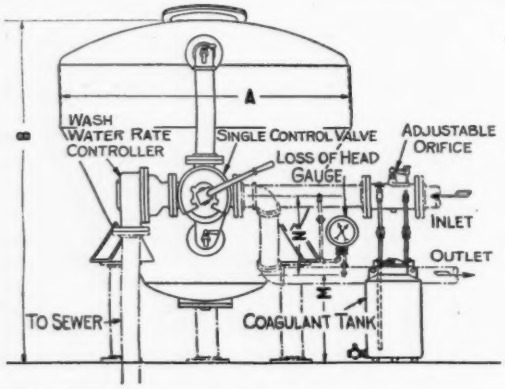
onto and into the fiber and shades the whites very seriously. So much so in fact, that if the white water is filtered through an ordinary paper filter, it will be found that practically all traces of color have been removed from the water by the fiber during the formation of the paper.

"The troublesome growths in paper making are chiefly forms of bacteria or closely allied organisms. They are brought in by the water and finding the proper substances for their sustenance in the stuff chest they grow prodigiously and produce the familiar slime to productive of trouble and expense. Often, large quantities of chlorine are applied to the stuff chest in an effort to destroy the slimes, the paper manufacturer apparently entirely overlooking the fact that if the water were properly filtered and a residual free chlorine content of two tenths part per million, equivalent to a pound and a half of chlorine per million gallons, were left in the water, the growth of slimes would be arrested at the very beginning and it would be unnecessary to destroy untold billions of bacteria with chlorine after they had formed in the stuff chests. The bacteria would be destroyed as fast as they appeared and none would be left to infect the stuff chest.

"This effective method of meeting the slime problem is apparently so simple that it is often disregarded by the paper maker. It would almost seem that the average manufacturer believes he secures effective results only when a considerable commotion is created while consummating the operation.

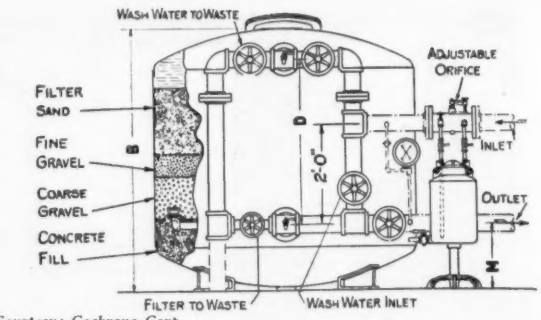
"Virtual freedom from iron and magnesia in the water is also essential, of course, for very small quantities of these substances can stain the felts seriously and discolor the sheet. A good rule is to employ no water which contains more than three-tenths part of such impurities per million, though there are authenticated cases where water having a somewhat greater iron content is employed quite successfully. Such happy results are secured occasionally for the reason that the iron is held strongly in solution and precipitates only with difficulty. However, it is not safe to count upon such unusual characteristic, for it is rarely a permanent one.

"The circumvention of virtually all these familiar ills can be effectively consummated, however, by a modern, well designed filter plant, effecting a most decided improvement in the quality and appearance of the paper. Such a plant is a wonderfully efficient item of equipment, possessing capabilities far beyond the average understanding. It can handle waters which appear incredibly bad and make them excellent for the most particular of technical processes. Contrary to the general belief that filtration is merely a straining process, a modern filter plant demonstrates effectually that it can remove all the impurities that effect the quality of paper, since the purification process not only includes filtration, but is supplemented by chemical treatments which produce coagulation and sterilization.



Courtesy: Cochrane Corp.

FIG. 3.
Conical type gravity filter.



Courtesy: Cochrane Corp.

FIG. 4.
Vertical pressure filter showing stratified filter bed.

"The auxiliary equipment entailed includes mixers for promoting coagulation and settling basins for providing a detention period during which the sedimentation and chemical reactions are largely effected. In cases of excessive industrial contaminations, additional chemical feeds are provided for the neutralization of acids or alkalis and finally, after the water has passed the filters, correction of the acidity of the filtered water may be entailed, so that objectionable corrosion of the pipes and distribution system in general is arrested. In many cases, chlorination of the filtered water is practiced, to inhibit the growth of bacteria, or of algae.

"Such a plant eliminates color, bacteria, suspended matter and certain forms of dissolved matter. It delivers clear water, bright, clear, sparkling and odorless, even though the water supply be little better than offensive sewage heavily contaminated with dyes and other industrial wastes. Although not strictly a part of the filtration process, hydrogen ion concentration correction should advisably follow, in order to offset any corrosive properties the water would otherwise possess and thereby avoid deterioration of the iron distribution system to the detriment of both the piping and the water.

"The operation of a modern filter plant of this character is simplicity itself, the coagulent feeds being automatic and proportionate. The water flows, after treatment with a coagulant, through a mixer for about twenty minutes, during which time profuse coagulation is produced, and then enters the sedimentation basin proper where, by reason of the heavy coagulation, extremely rapid sedimentation takes place. The result is that in from one to four hours the chemical reaction is complete and most of the suspended matter has fallen to the bottom of the basin.

"The water flows through the filter plant in a continuous process and after leaving the sedimentation basin passes, by gravity, to the filters. These latter units are in paper mill service preferably of the gravity type and the water passes down through them into the clear water chamber where chlorination can be, and pH correction must be, effected by means of simple automatic apparatus. A plant of this type having a capacity of five million gallons per day can be operated by one man per shift and the use on the average of chemicals valued at about $3.00 per million gallons of water filtered.

"The periodic washing which is necessary with any type of filter plant can be discharged in the case of a modern gravity filter in from five to ten minutes per unit, regard-

less of its size, by employing both air and water wash. The most preferable type of filter uses about ten gallons of wash water per square foot of filter area per minute, delivered upward through the filter, and at the same time about six gallons of air delivered through a separate piping system placed above the gravel layers of the filter. The air and water together produce a violent agitation which almost immediately loosens the impurities from the sand and the refuse is promptly carried to the drain by the water. Despite the thorough agitation of the filter bed, the inflow of water is not sufficient to disturb the gravel and the filters will function indefinitely without danger of residual alumina.

"As an illustration of the effectiveness of these modern filter plants, two instances of interest may be cited. One is in a plant where a quite unusual degree of water purity is required and where the water before treatment contains anywhere from thirty to seven hundred parts of turbidity per million and a color content of from twenty to sixty parts per million. Absolutely no trace of the purifying chemicals is allowed in the filtered water, making the following average analysis of results secured noteworthy.

Turbidity	0.0
Color	0.0
Iron	0.01
Residual alumina	0.0

"The other instance is on the Passaic river below Paterson,, N. J., where the color content of the river water often reaches three thousand and in other ways is extremely foul, also resembling sewage. This water has to be used in one of the most delicate of process operations in which neither color nor odor are permissible. Exacting as are these requirements, the filtration is so effectively consummated with a system of modern gravity filtration that the filtered water analyzes:

Color	0.3
Iron	0.0
Residual alumina	0.0
Odor	0.0

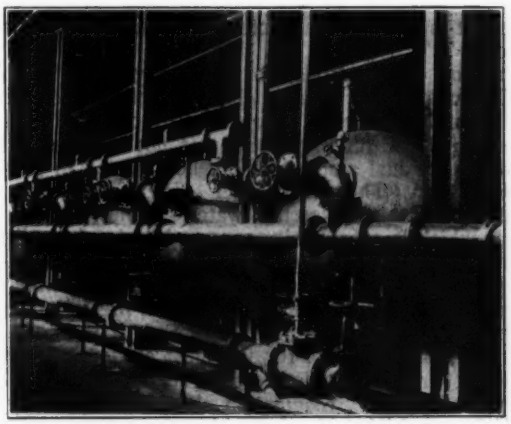
In appearance, the water is bright, clear, sparkling and odorless and is comparable with the spring water supplies commonly bottled.

"So far as the actual contact of the water with the

Courtesy: Norwood Engineering Co.

FIG. 5.

Large gravity filter plant at the International Paper Co., Three Rivers, Que.



Courtesy: Norwood Engineering Co.

FIG. 6.

Pressure filter plant at the Deerfield Glassine Co., Monroe Bridge, Mass.

fiber is concerned, it seems to make little difference whether the water is hard or soft. Cellulose will load with some substances, particularly silica, but it does not appear to have the property of loading up with lime and magnesia. This being the case, it is only necessary to soften the water for two of the processes allied to paper making; for the water used in boiling-off the fiber in the digesters and for the boiler feed water.

"The necessity of softening the water for use in the digestors is due to the fact that if the water is very hard, the lime will be precipitated and may attach itself to the fibers, making a harsh, rough fiber which is undesirable. In the case of boiler feed water, there is not the slightest question but that the softening of the water is essential, particularly if the water is to be used in the high pressure, high temperature steam generators of the modern boiler plant."

Gravity or Pressure Filtration

From the foregoing, an excellent conception of a modern filter plant is readily formed, but before proceeding with a consideration of the chemical treatment for softening the clarified water, when necessary or advisable, and the related questions of feed water and steam purification, a few remarks concerning approved types of filtering and pre-filtering equipment will prove of interest, together with a brief exposition of the particular functions they discharge. Such a review is advisable, incidentally, for the reason that while filtration proper is a finishing process and the function of the filters is to remove completely all traces of suspended matter from the water, the suspended matter is apt to be not only the original mud,, silt and other impurities that existed in the raw water supply, but the products and by-products of the advance coagulation as well, the processes of coagulation and sedimentation being initial stages in most systems of modern water purification.

Coagulation, the first of these advance operations, involves the use of measured proportions of alum, sodium aluminate, ferrous sulphate or some other coagulant, as indicated by an analysis of the unfiltered water. It precipitates the dissolved coloring matter, turbidity, bacteria, industrial wastes and other forms of contamination present in the unfiltered water supply, by gathering these impurities into comparatively large, insoluble masses which rapidly settle in the sedimentation basin. The residue, composed of the finer particles of foreign matter which to do precipitate out during the period of sedimentation, passes on to the filter, in which, if the filter is properly de-

signed, it is retained and actually assists in the filtration process.

The most commonly used of these coagulants is sulphate of alumina, for the reasons that it is efficient and inexpensive and can be so completely decomposed and removed in the filtration process that not a trace of alum or of the residual aluminates can be detected in properly filtered water. The use of other efficient coagulants may be more advisable for certain water supplies, but this is a matter which is of necessity governed by local conditions. However, every water supply and coagulating chemical has an optimum coagulating pH value or range, in which the coagulation must take place if maximum precipitation and complete removal of the impurities and of the coagulant is to be effected. Also, for the most economical feeding of the post-treatment pH correcting chemical in the softening of the water, coagulation should be maintained at the highest possible pH value within the optimum range.

The sedimentation following the coagulation is quite customarily effected in a basin holding a supply of water adequate for all requirements over a period of several hours, during which time not only is the sedimentation of the heavy coagulation consummated, but time is provided for the completion of retarded chemical reaction between the coagulant and the impurities in the water which did not respond immediately to the treatment. With both sedimentation and a certain amount of coagulation taking place in the sedimentation tank, the proportions and capacity of such basin are considerations which effect to a considerable extent the effectiveness and efficiency of the filter plant. In fact, the water entering the filters should be as clear as can be secured by sedimentation, for the less work imposed on the filters the more efficiently will they complete the purification of the water supply.

Many Varieties in Design

As for the filters themselves, there are, naturally, many varieties in design and construction, to meet not only the requirements of the water, but also of the filter site. They may be of the gravity or of the pressure type, the distinction being that the pressure filters consist of tanks enclosing the filtering media through which the water is pumped under more or less pressure to the various points of distribution, while in the gravity type filter, the water flows through the filter bed of sand and gravel by gravity. A pump has usually to be located on the discharge side of a gravity filter and, frequently, a pump has also to be employed for handling the raw water supply. With either type, almost any degree of water purification can be realized by filtration, if the proper equipment is installed.

In news and board mills, where the complete removal of color from the water is not apt to be essential, although the removal of all turbidity and grit is highly important as a precaution against excessive damage to felts, wires and other equipment, either pressure or gravity filters prove satisfactory, the advisable choice usually being determined by the condition of the raw water. In such installations, the filters are called upon to serve as fine strainers more than as water purification units.

In the finer mills, however, where the production of pure white sheets or the matching of colors is important, it is advisable to install a complete filter plant, with chemical treatment, coagulating basins, gravity filters, clear well for water storage, etc. For installations of this character, pressure filters are not usually recommended, not that it makes much difference whether the water is pushed through the filters under pressure or is allowed to flow through the sand and gravel by gravity, but rather because the condition of the gravity filter is more readily noted. There is also difficulty in effecting an efficient and effective coagulating basin with a pressure filter, for if a standard open coagulating basin is used, the water has to be picked up at the discharge weir by a pump and this may invite trouble. In some cases, the flow will be broken up by its passage through the pump and divided into such small particles that it will be forced through the filters.

To circumvent these drawbacks to the more extensive use of pressure filters, overhead storage tanks, or standpipes, have been installed to serve as coagulating basins. The expedient of using a pressure tank for a coagulating basin has also been tried, but none of these more uncommon arrangements has proved as satisfactory in the long run as the straight gravity filter plant with an open coagulating basin of suitable proportions.

In many of the older mills, where the mill was constructed without consideration of water purification and no provisions made for the installation of a filter plant at some later date, it is frequently necessary to build the filters into any available space and to resort to various methods of tying the filter plant into the supply system of the mill. Often the installation of the filters has to be made under the beater or machine room and the investment entailed under such circumstances is somewhat augmented, it being much more economical to layout a mill and install the filter plant in a separate building located as close as possible to the source of water and points of distribution. Fortunately, there are numerous, compact filter units on the market, costing from $10.00 to $15.00 per square foot of bed area, and even should the cost run considerably more the expense entailed for an efficient water purifying plant is a small price to pay for freedom from the interruptions due to spring freshets and for the avoidance of paper rejections on account of off color due to unsatisfactory water.

(To be continued)

Investigating European News Print

That the Government authorities are investigating the importations of European news print to determine whether or not the Anti-Dumping Act is being violated is announced in a circular letter to its subscribers by the Import Committee of the American Paper Industry. The announcement is as follows:

For the past three years the condition of United States mills making standard news print has been rapidly growing more serious, not only because of the diversion of production to Canadian mills located more closely than many United States mills to the sources of the basic raw material, but particularly because of the increasing importations of this paper from Europe at steadily decreasing prices.

Whether there has been dumping of European news print, under conditions which require the application of the Anti-Dumping act, has been before Government authorities for the past three years. At last the condition became so serious that justice to a great American industry, deprived of other tariff protection by being in competition with foreign mills producing merchandise on the free list, demanded at least a thorough investigation. The Government officials found what seemed to them to be prima facie evidence that foreign paper was being sold here at prices involving dumping, and called upon the Import Committee to provide evidence, if any, as to injury done the American industry by such practices.

The Import Committee following its policy of providing the Government officials with facts as to foreign competition, has secured and filed specific evidence of injury by imports from one foreign country.

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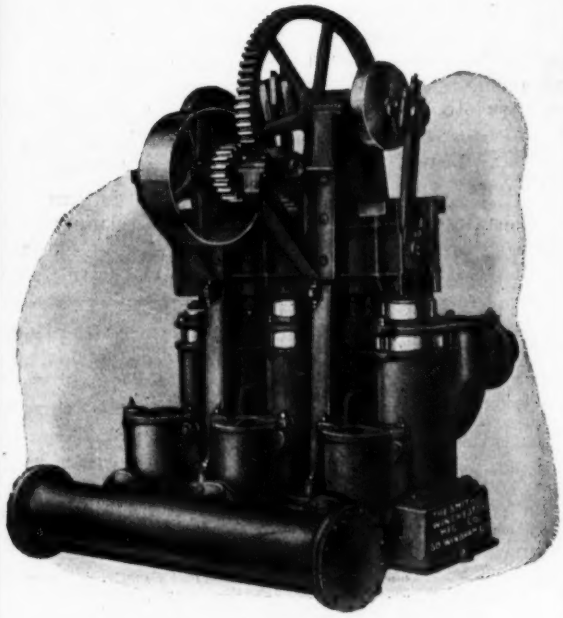
is on a par with all other Pulp and Paper Mill Equipment we manufacture. The fact of its satisfactory use in leading mills attests its efficiency.



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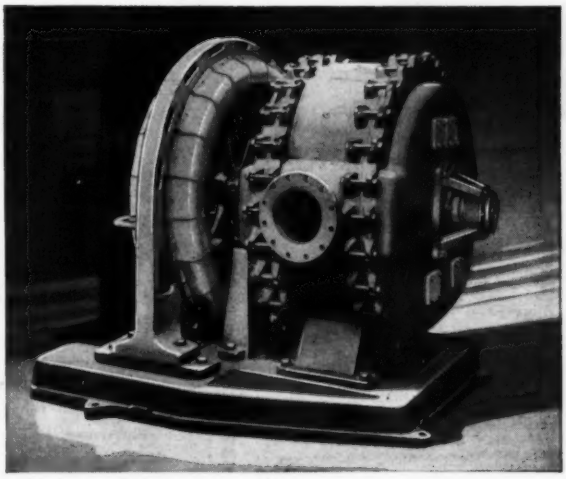
13 HYTORS AT THREE RIVERS



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Nash Hytor
VACUUM PUMPS & COMPRESSORS

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING JULY 18, 1931

SUMMARY

Cigarette paper	1847 cs.
Wall paper	5 bls., 12 cs.
Paper hangings	3 pkgs., 2 cs.
News print	7083 rolls
Printing paper	53 rolls, 10 bls., 27 cs.
Wrapping paper	35 rolls, 8 cs.
Kraft paper	6 rolls
Decalcomania paper	32 cs.
Drawing paper	19 rolls, 113 cs.
Filter paper	3 bls., 71 cs.
Surface coated paper	151 cs.
Metal coated paper	97 cs.
Baryta coated paper	92 cs.
Coated paper	10 cs.
Photo paper	2 cs.
Aluminum paper	18 cs.
Gold coated paper	4 cs.
Pith paper	1 cs.
Mother-of-pearl paper	2 cs.
Tissue paper	6 cs.
Bristol boards	6 cs.
Stencil paper and ink	14 cs.
Writing paper	24 cs.
Envelopes	9 cs.
Envelope paper	20 bdls.
Card board	207 cs.
Miscellaneous paper	8 bls., 103 rolls, 114 cs.

CIGARETTE PAPER

Brown & Williamson Tobacco Co., Olympic, Southampton, 10 cs.
Brown & Williamson Tobacco Co., Paris, Havre, 7 cs.
American Tobacco Co., Indep. Hall, Bordeaux, 700 cs.
De Manduit Paper Corp., Indep. Hall, St. Nazaire, 1130 cs.

WALL PAPER

Tice & Lynch, Amer. Banker, London, 1 cs.
Irving Trust Co., Deutschland, Hamburg, 11 cs.
F. J. Emmerich, Deutschland, Hamburg, 4 bls.
Globe Shipping Co., Deutschland, Hamburg, 1 bl.

PAPER HANGINGS

Whiting & Patterson Co. Inc., Olympic, Southampton, 1 cs.
The Display Center, Inc., Paris, Havre, 3 pkgs.
Rohner Gehrig Co., Paris, Havre, 1 cs.

NEWS PRINT

Jay Madden Corp., America, Hamburg, 97 rolls.
Parsons & Whittemore, Inc., America, Hamburg, 180 rolls.
Perkins Goodwin Co., Dresden, Bremen, 394 rolls.
Jay Madden Corp., Dresden, Bremen, 774 rolls.
Stora Kopperberg Corp., Drottingholm, Gothenburg, 60 rolls.
Perkins Goodwin & Co., Pr. Roosevelt, Hamburg, 142 rolls.
——, Deutschland, Hamburg, 307 rolls.
W. H. Bell, Markland, Liverpool, N. S., 4014 rolls.
Jay Madden Corp., Berlin, Bremen, 1115 rolls.

PRINTING PAPER

Keuffel & Esser Co., America, Hamburg, 53 rolls.
E. Dietzgen & Co., Statendam, Rotterdam, 25 cs.
Walker Goulard Plehn Co., Statendam, Rotterdam, 10 bls.
T. N. Fairbanks Co., Olympic, Southampton, 2 cs.

WRAPPING PAPER

Sylvania Industrial Corp., Gelgenland, Antwerp, 8 cs.
Marine Midland Trust Co., Deutschland, Hamburg, 35 rolls.

KRAFT PAPER

Jay Madden Corp., Deutschland, Hamburg, 6 rolls.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Baltic, Liverpool, 29 cs. (duplex).
C. W. Sellers, Deutschland, Hamburg, 3 cs.

DRAWING PAPER

Keuffel & Esser Co., America, Hamburg, 52 cs., 9 rolls.
Keuffel & Esser Co., Pr. Roosevelt, Hamburg, 59 cs., 10 rolls.
Devoe & Reynolds Co., Minnetonka, London, 2 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., Minnetonka, London, 4 cs.
E. Fougera Co., Olympic, Southampton, 62 cs.
A. Giese & Son, Deutschland, Hamburg, 5 cs.
Happel & McAvoy, Deutschland, Hamburg, 3 bls.

SURFACE COATED PAPER

——, America, Hamburg, 4 cs.
Gevaert Co. of America, Pennland, Hamburg, 87 cs.
Gevaert Co. of America, Belgenland, Antwerp, 57 cs.
Phoenix Shipping Co., Deutschland, Hamburg, 3 cs.

METAL COATED PAPER

Globe Shipping Co., Bremen, Bremen, 12 cs.
K. Pauli Corp., Deutschland, Hamburg, 55 cs.
——, Deutschland, Hamburg, 30 cs.

BARYTA COATED PAPER

Globe Shipping Co., Berlin, Bremen, 92 cs.

COATED PAPER

W. A. Foster & Co., Mauretania, Southampton, 2 cs.
W. J. Byrnes, Mauretania, Southampton, 1 cs.
F. C. Gerlach, Berlin, Bremen, 7 cs.

PHOTO PAPER

J. J. Gavin, Olympic, Southampton, 2 cs.

ALUMINUM PAPER

——, Berlin, Bremen, 18 cs.

GOLD COATED PAPER

Majestic Shipping & F'd'g Co., Berlin, Bremen, 4 cs.

PITH PAPER

Nosawa & Co., Kinai Maru, Keelung, 1 cs.

MOTHER-OF-PEARL PAPER

S. H. Pomerance, Deutschland, Hamburg, 2 cs.

TISSUE PAPER

B. F. Drakenfeld & Co., Baltic, Liverpool, 4 cs.
F. C. Strype, Baltic, Liverpool, 1 cs.
International F'd'g Co., Kinai Maru, Yokahama, 1 cs.

BRISTOL BOARDS

Favor Ruhl Co., Minnetonka, London, 5 cs.
Devoe & Reynolds Co., Minnetonka, London, 1 cs.

STENCIL PAPER AND INK

Arlac Dry Stencil Co., Deutschland, Hamburg, 14 cs.

WRITING PAPER

Guibout Freres, Olympic, Southampton, 4 cs.
Simfred, Paris, Havre, 12 cs.
Globe Shipping Co., Paris, Havre, 2 cs.
J. D. Smith, Paris, Havre, 1 cs.
American Express Co., Waukegan, Havre, 4 cs.
Bloomingdale Bros., Waukegan, Havre, 1 cs.

ENVELOPES

Gevaert Co. of America, Pennland, Antwerp, 2 cs.
J. Beckhard Co., Bremen, Bremen, 7 cs.

ENVELOPE PAPER

J. P. Heffernan Paper Co., Cristobal Colon, Bilbao, 20 bdls.

CARD BOARD

Gevaert Co. of America, Pennland, Antwerp, 7 cs.
Gevaert Co. of America, Belgenland, Antwerp, 3 cs.
Houbigant Inc., Paris Havre, 5 cs.
American Express Co., Deutschland, Hamburg, 192 cs.

MISCELLANEOUS PAPER

D. F. Young, Dresden, Bremen, 3 cs.
Keuffel & Esser Co., Statendam, Rotterdam, 13 cs.
Steiner Paper Corp., Statendam, Rotterdam, 8 cs.
C. W. Sellers, Caledonia, Glasgow, 3 cs.
W. Bersch, Sacandaga, Rotterdam, 7 cs.
W. A. Foster Co., Minnetonka, London, 3 cs.
Dunham & Reeve, Drottningholm, Gothenburg, 54 rolls.
Dunham & Reeve, Hallaren, Norrkoping, 49 rolls.
Keller Drian Paper Co., Paris, Havre, 2 cs.
D. F. Young, Paris, Havre, 2 cs.
Standard Products Corp., Paris, Havre, 54 cs.
J. Rmer, Kinai Maru, Kobe, 8 cs.
R. F. Downing & Co., Deutschland, Hamburg, 3 bls.
Phoenix Shipping Co., Deutschland, Hamburg, 5 bls.
L. A. Consmiller, Berlin, Bremen, 5 cs.
L. C. Dever, United States, Copenhagen, 6 cs.

RAGS, BAGGINGS, ETC.

R. F. Downing & Co., Statendam, Rotterdam, 53 bls. rags; 16 bls. bagging.
——, Caledonia, Glasgow, 52 bls. paper stock.
Castle & Overton, Inc., Caledonia, Glasgow, 61 bls. rags.
Darmstadt Scott & Courtney, Sacandaga, Rotterdam, 29 bls. thread waste.
J. Cohen Son & Co., Samaria, Liverpool, 28 bls. paper stock.
Castle & Overton, Inc., Indep. Hall, St. Nazaire, 139 bls. rags.
H. G. Lichtenstein, Indep. Hall, St. Nazaire, 179 bls. rags.
E. Butterworth & Co. Inc., Boston City, Bristol. 391 bls. rags.
Bank of N. Y. & Trust Co., Cristobal Colon, Coruna, 71 bls. bagging.
Bank of N. Y. & Trust Co., Cypria, Barcelona, 258 bls. jute waste.
——, Clara, Trieste, 48 bls. rags.
——, Sinaia, Alexandria, 11 bls. rags; 210 bls. bagging.
S. Birkenstein & Sons, Cabo Tortosa, Barcelona, 128 bls. rags.
Chase National Bank, Cabo Tortosa, Barcelona, 91 bls. bagging.
Banco Coml Italiana Trust Co., Cabo Tortosa, Leghorn, 139 bls. rags.
——, Cabo Tortosa, Genoa, 31 bls. rags.
T. D. Downing & Co., California, Glasgow, 231 bls. rags.
——, California, Glasgow, 38 bls. rags.
Castle & Overton, Inc., Berlin, Bremen, 39 bls. rags.
E. J. Keller Co. Inc., Sac City, ——, 112 bls. bagging.
E. J. Keller Co. Inc., Cameronia ——, 38 bls. rags.
E. J. Keller Co. Inc., A. Ballin, ——, 41 bls. rags.

OLD ROPE

E.J. Keller Co. Inc., Kyno, ——, 79 coils.
G. W. Miller & Co., Kyno, Hull, 140 coils.
W. Steck & Co., Kyno, Hull, 57 coils.
Brown Bros. Harriman & Co., Cristobal Colon, Coruna, 40 coils.

WOOD FLOUR

B. L. Soberski, Statendam, Rotterdam, 500 bags.
Trust Co. of New Jersey, Statendam, Rotterdam, 300 bags.
A. Kramer & Co., Statendam, Rotterdam, 200 bags.
State Chemical Co., Coahoma County, Rotterdam, 570 bags, 34360 kilos

(Continued on page 48)

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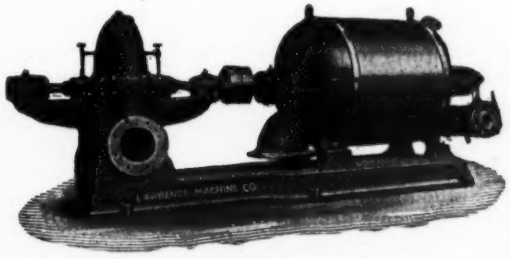

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UNITED CARBON COMPANY
CHARLESTON WEST VIRGINIA

Imports of Paper and Paper Stock

(Continued from page 46)

WOOD PULP

Bulkley Dunton & Co., Kersten Miles, ——, 11855 bls. wood pulp.
Parsons & Whittemore, Inc., Kersten Miles, Sundsvall, 50 bls. chemical pulp.
Johaneson Wales & Sparre, Inc., Kersten Miles, Sundsvall, 125 bls. chemical pulp.
——, Kersten Miles, Hernosand, 900 bls. sulphite, 152 tons; 300 bls. sulphate, 50 tons; 164 bls. pulp residue, 35 tons.
Lagerloef Trading Co., Carplaka, Rauma, 2185 bls. sulphite, 973 tons.
Bulkley Dunton & Co., Carpalka, ——, 1750 bls. sulphate, 350 tons.
M. Gottesman & Co., Inc., Carplaka, Iggesund, 3375 bls. sulphite, 675 tons.
Finnish Cellulose Assn., Carplaka, Kemi, 2200 bls. sulphate, 367 tons.
——, Carplaka, Kemi, 175 bls. sulphite, 29 tons.
J. Anderson & Co., Drottningholm, Gothenburg, 500 bls. sulphite.
E. M. Sergeant & Co., Drottningholm, Gothenburg, 454 bls. sulphate.
Russell McCandless, Drottningholm, Stockholm, 1850 bls. unbleached sulphite.
——, Hallaren, Gothenburg, 117 bls. pulp residue.
Castle & Overton, Inc., Deutschland, Hamburg, 3172 bls. wood pulp, 646 tons.

BOSTON IMPORTS

WEEK ENDING JULY 18, 1931

Finnish Cellulose Assn., Carplaka, Kemi, 6114 bls. sulphate, 1021 tons.
Lagerloef Trading Co., Carplaka, Rauma, 715 bls. sulphite, 105 tons.
Stone & Downer, Hallaren, Norrsundet, 10 rolls paper.
J. Anderson & Co., Hallaren, Gothenburg, 2000 bls. sulphite.
Johaneson Wales & Sparre, Inc., Hallaren, Gothenburg, 299 bls. kraft soda pulp.
Parsons & Whittemore, Inc., Hallaren, Gothenburg, 240 bls. sulphite.
Perkins Goodwin & Co., Hallaren, Gothenburg, 1905 bls. sulphite; 762 bls. sulphate.
Beech Nut Packing Co., Hallaren, Gothenburg, 137 rolls wrapping paper.
Brown Bros. Harriman & Co., Kyno, Hull, 212 coils old rope.
W. A. Feinberg & Son, Kinai Maru, Kobe, 30 bls. rags.
E. J. Keller Co. Inc., Bellhaven, ——, 68 bls. bagging.

PORTLAND IMPORTS

WEEK ENDING JULY 18, 1931

M. Gottesman & Co. Inc., Carplaka, Iggesund, 1250 bls. sulphate, 250 tons.
Pagel Horton & Co. Inc., Carplaka, Sikea, 2400 bls. sulphite.
Finnish Cellulose Assn., Carplaka, Kemi, 3781 bls. sulphite, 630 tons; 460 bls. sulphate, 76 tons.
——, Carplaka, Kemi, 1200 bls. sulphite, 200 tons.
Lagerloef Trading Co., Carplaka, Kemi, 700 bls. sulphite, 117 tons.
Lagerloef Trading Co., Carplaka, Rauma, 2835 bls. sulphite, 445 tons; 130 bls. pulp, 26 tons.
Waterfalls Papermills Co., Clara, Trieste, 5405 bls. wood pulp.

CAMDEN IMPORTS

WEEK ENDING JULY 18, 1931

Finnish Cellulose Assn., Carplaka, Kemi, 3700 bls. sulphate, 617 tons.

PHILADELPHIA IMPORTS

WEEK ENDING JULY 18, 1931

Finnish Cellulose Assn., Carplaka, Kemi, 1900 bls. sulphite, 316 tons; 670 bls. sulphate, 106 tons.
Katzenstein & Keene, Inc., Indep. Hall, Bordeaux, 511 bls. rags.
Natl. Vulcanized Fibre Co., Indep. Hall, Bordeaux, 52 bls. rags.
Natl. Vulcanized Fibre Co., Indep. Hall, St. Nazaire, 55 bls. rags.
H. G. Lichtenstein, Indep. Hall, St. Nazaire, 139 bls. rags.
P. Berlowitz, Indep. Hall, St. Nazaire, 283 bls. rags.
1st Natl Bank of Boston, Boston City, Bristol, 113 coils old rope.
The Barrett Co., Boston City, Bristol, 76 tons china clay.
J. Horne Co., Waukegan, Havre, 4 cs. writing paper.
Strawbridge & Clothier, Waukegan, Havre, 9 cs. writing paper.
Halle Bros., Waukegan, Havre, 4 cs. writing paper.
Union Waste Co., Waukegan, Havre, 25 bls. rags.
National Vulcanized Fibre Co., Waukegan, Dunkirk, 68 bls. rags.
Castle & Overton, Inc., Waukegan, Dunkirk, 51 bls. rags.
Bank of N. Y. & Trust Co., Cypria, Barcelona, 125 bls. rags.
J. Anderson & Co., Clara, Trieste, 1395 bls. wood pulp.
E. J. Keller Co. Inc., Elmshorn, ——, 62 bls. rags.
E. J. Keller Co. Inc., Natirar, ——, 713 bls. wood pulp.
E. J. Keller Co. Inc., Augvald, ——, 38 bls. rags.
E. J. Keller Co. Inc., Sac City, ——, 191 bls. rags.

NEWPORT NEWS IMPORTS

WEEK ENDING JULY 18, 1931

Perkins Godwin & Co., Hallaren Gothenburg, 5959 bls. kraft pulp; 1661 bls. sulphate.
Sylvanid Industrial Corp., Hallaren Gothenburg, 699 bls. sulphite.
Johaneson Wales & Sparre, Inc., Hallaren Gothenburg, 598 bls. kraft soda pulp.
Brown Bros. Harriman & Co., Hallaren Gothenburg, 900 bls. sulphite.

BALTIMORE IMPORTS

WEEK ENDING JULY 18, 1931

Parsons & Whittemore, Inc., Kersten Miles, Sundsvall, 303 rolls news print.
Johaneson Wales & Sparre, Inc., Kesten Miles, Sundsvall, 375 bls. sulphite.
Bulkley Dunton & Co., Kersten Miles, ——, 8625 bls. wood pulp.
Parsons & Whittemore, Inc., Kersten Miles, Svartvik, 1200 bls. mechanical pulp; 115 bls. chemical pulp.
M. Gottesman & Co. Inc., Kersten Miles, Svartvik, 9790 bls. sulphite.
Johaneson Wales & Sparre, Inc., Kersten Miles, Svartvik, 510 bls. sulphite; 250 bls. chemical pulp.
——, Kersten Miles, Hernosand, 300 bls. sulphite, 50 tons; 300 bls. sulphate, 50 tons.
Pagel Horton & Co., Inc., Kersten Miles, Soderhamn, 500 bls. sulphate, 101 tons.
Perkins Goodwin & Co., Hallaren, Gothenburg, 1524 bls. kraft pulp.
E. M. Sergeant & Co. Inc., Hallaren, Gothenburg, 598 bls. kraft soda pulp.
Brown Bros. Harriman & Co., Hallaren, Gothenburg, 2500 bls. sulphite.
Price & Pierce, Ltd., Hallaren, Gothenburg, 150 bls. chemical pulp.
Hubbs Corning & Co., Hallaren, Gothenburg, 281 rolls paper.
Russell McCandless, Braheholm, Stockholm, 1150 bls. unbleached sulphite.

NEW ORLEANS IMPORTS

WEEK ENDING JULY 18, 1931

Whitney National Bank, Kersten Miles, Sundsvall, 1016 rolls news print.
Parsons & Whittemore, Inc., Kersten Miles, Sundsvall, 701 rolls news print.
Parsons & Whittemore, Inc., Kersten Miles, Essvik, 1000 bls. chemical pulp.
——, Kersten Miles, Hernosand, 219 bls. pulp residue, 48 tons.

Now Dillons Klipstein Ltd.

The activities of Dillons Limited and A. Klipstein & Co. Limited of Canada have been consolidated and in the future will be conducted under the name of Dillons Klipstein Limited with offices at 205 St. Paul street, West, Montreal and 95 King street, East, Toronto, Canada. Dillons Klinestein Limited have been appointed Selling The Kalbfleisch Corporation, and A. Klipstein & Co., Inc. Agents for Canada for the American Cyanamid Company,

The new company will continue to handle the same products formerly sold by Dillons Limited and A Klipstein & Co., Limited.

Chicago Paper Market Less Active

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., July 18, 1931.—Mid July declines in activity in various lines making up the Chicago paper industry are reported this week. The fine paper representatives are slowly finding themselves after the price upheaval and, aside from the fact that they'll have to struggle along with less margin of profit, the fine paper men are fairly well pleased with the volume shown at this time of year. Kraft paper representatives, too, are looking optimistically toward the fall of the year, believing that stringent efforts to maintain the price of kraft are going to bring in line buyers who have been following a "watchful waiting" policy. The kraft price remains fairly steady and volume is about as good as general conditions could lead one to expect. Glassines are reported unchanged. News print and ground woods are dull and there is little important demand reported. Book and cover papers are in fair demand, though spotty, and the prices remain at about even keel. The waste paper market reports that the higher grades show some activity with the lower grades practically at a standstill.

F. A. Augsbury Inspects Timber Tracts

[FROM OUR REGULAR CORRESPONDENT]

OGDENSBURG, N. Y., July 20, 1931—Frank A. Augsbury, president of the Algonquin Paper Company, and family, left this week by automobile for extended sojourn at Mont Louis, P. Q., Canada. The party expects to be gone several weeks and it is said to be his intention to make an inspection tour of the extensive timber tracts held by his company in that region. The Canadian forests have supplied a considerable portion of the pulp wood used at the local plant in recent years and the region around Mont Louis is far from being exhausted.

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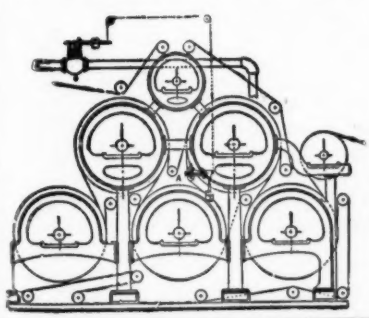

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W. F. PICKLES **Buckland, Conn.**

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, July 22, 1931.

Trading in the local paper market was only moderately active during the past week. Supplies are moving into consumption at a fairly satisfactory pace for the time of year. Sales forces of the local paper organizations are making plans for the Autumn campaign and are generally optimistic. Prices are generally holding to schedule.

Conditions in the news print market are practically unchanged. Demand from the publishers is rather restricted, at present, but stocks on hand are not excessive, and an expansion of business is anticipated in the near future. Production in the United States and Canada is being maintained in sufficient volume to take care of current requirements. Prices remain unchanged.

The paper board market is irregular. Sales of box board during the past week were below the volume secured in the corresponding period of the preceding year. The fine paper market is quiet, although prices are fairly steady. Tissues are going forward in satisfactory volume. The coarse paper market is spotty. Kraft wrapping paper is in seasonal request.

Mechanical Pulp

Demand for ground wood has fallen off for the time being. Both domestic and imported mechanical pulp are easier. Offerings of all grades are sufficient to take care of current needs. Prices are weaker. No. 1 imported moist ground wood is now quoted at from $24 to $28, on dock, Atlantic ports. No. 1 domestic mechanical pulp is selling at from $25 to $30, f.o.b. mill.

Chemical Pulp

The chemical pulp market is practically unchanged. No radical price changes have been recorded of late and the industry is considered in a sound statistical position. Inquiries for future account are fairly frequent and trading should become more lively in the near future. Prices are generally holding to previous recorded levels.

Old Rope and Bagging

Quietness reigns in the old rope market. Demand for foreign and domestic old manila rope is restricted. Prices are easier. Imported old manila rope is now quoted at from 1.90 to 2.00. Domestic old manila rope is selling at from 2.10 to 2.00. Small mixed rope is dull. Weaknesses developed in the bagging market. Foreign gunny No. 1 is offered at from 1.60 to 1.75.

Rags

The domestic rag market is not arousing much interest at present. Demand for cotton rags is light and prices are easier. New white No. 1 shirt cuttings are now quoted at from 6.50 to 7.00 and New white No. 2 at from 5.50 to 6.00. Roofing grades are in good demand at firm prices. The request for mixed rags is well maintained. The imported rag market continues dull.

Waste Paper

The bright particular feature of the paper stock market during the past week was the increased demand for old kraft machine compressed bales. Offerings of this grade are becoming scarce and prices are firmer, the current quotation being from 1.20 to 1.30. Board mills are still interested in No. 1 mixed paper, which continues steady.

Twine

Business in the twine market continues dull, affected by the holiday period and the general depression. Most of the business transacted during the past week was along routine lines and for immediate requirements. The outlook for the closing months of the year, however, is fairly bright, and the seasonal expansion of trading should soon begin.

Indianapolis Demand Quiet

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., July 20, 1931.—Demand for various paper products in this territory is just about holding its own. Just now dealers are having to work harder than ever on the fine paper grades. Movement has been sadly hampered by the coming of hot weather and competition is pretty keen. Every effort is being made to keep prices stable, but those jobbers with rather heavy stocks are still anxious to reduce them. In another month the trade should brighten considerably, they say, due to the approach of the new school year. The last week has seen a dearth of mill representatives in the city and it is perhaps just as well judging from present demand.

Container manufacturers in this section, except those making waxed containers for the ice cream trade, report only a fair volume, even for this time of the year. They expect fall to be better, however. The kraft situation is in the best shape it has been for some time. Every effort is for price stabilization and some buying has resulted.

Paper stock remains dead. Local paper stock men are buying at prices they themselves set with no attempt to force buying. They are selling at a very short profit generally and are rather pessimistic concerning what will happen in the late summer.

First Shipment of Gulf Cotton Seed Fibre

HOPEWELL, Va., July 20, 1931.—A ship load of 7600 bales of cottonseed-hull shavings, the first shipment to Hercules Powder Company from the Gulf Region, was unloaded at Hopewell, Virginia, July 11 and 12. The shipment was made from Houston, Texas to the purification plant of the Hercules Powder Company at Hopewell, Virginia.

Shipment over the water route has enabled the powder company to buy cottonseed-hull shavings outside the cotton district immediately surrounding the Hopewell plant.

From the cotton by-product, the company manufactures chemical cotton which is used in the production of nitrocellulose, cellulose acetate, rayon, and fine papers.

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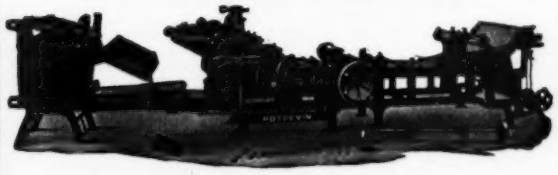

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Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, July 22, 1931.

BLANC FIXE.—Steadiness prevails in the blanc fixe market. Prices are holding to previously quoted levels, without difficulty. The pulp is quoted at from $42.50 to $45 per ton; while the powder is selling at from 3¾ cents to 4½ cents per pound, in barrels, at works.

BLEACHING POWDER.—The position of the bleaching powder market is practically unchanged. Shipments against contract are moving with regularity. Prices are holding to schedule. Bleaching powder is quoted at from $2 to $2.35 per 100 pounds, in drums, at works.

CASEIN.—Demand for casein is light. Domestic standard ground is quoted at 6 cents and finely ground at 7½ cents per pound. Argentine standard ground is selling at 8½ cents and finely ground at 9½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—The caustic soda market is only moderatively active at present. Prices generally remain unchanged. Solid caustic soda is quoted at from $2.50 to $2.55; the flake and the ground at from $2.90 to $2.95 per 100 pounds, in large drums, at works.

CHINA CLAY.—Conditions in the china clay market are fairly satisfactory. The contract movement is moderately heavy. Imported china clay is still quoted at from $13 to $21 per ton; while domestic paper making clay is selling at from $7 to $11 per ton, at mine.

CHLORINE.—Most of the business transacted in the chlorine market during the past week was along routine lines. The contract movement was well up to average. Chlorine is still quoted at $1.75 per 100 pounds, in tanks, or multi-unit cars, in large drums, at works.

ROSIN.—The rosin market is easier. Grades of gum rosin used in the paper mills are quoted at from $4.25 to $4.30 per 280 pounds, in barrels, at yards. Wood rosin is selling at $3.00 per 280 pounds, in barrels, car lot quantities, at southern shipping points.

SALT CAKE.—Business in the salt cake market is rather quiet. Contract shipments are fairly heavy. Salt cake is quoted at from $16 to $17 and chrome salt cake at from $14 to $15 per ton, in bulk, at works. Foreign salt cake is selling at from $15 to $15.50, ship side.

SODA ASH.—Production of soda ash is being maintained in sufficient volume to take care of current requirements. Prices are holding to schedule. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, 1; in bags, $1.15; and in barrels, $1.38.

STARCH.—The starch market is fairly active considering the prevailing business depression. Contract shipments are going forward to the mills at a steady pace. Special paper making starch is quoted at $2.67, in bags; and at $2.94 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—No radical changes were reported in the sulphate of alumina market. Prices are holding to schedule. Commercial grades are quoted at from $1.25 to $1.40; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market is steady. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—Supplies of talc are going forward to the paper mills in fairly satisfactory volume for the time of year. Prices are steady. Domestic talc is quoted at from $16 to $18 per ton, in bulk; while imported talc is selling at from $18 to $22 per ton, ship side.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	11.00	@38.00
Bonds	6.75	@53.25
Writings—		
Extra Superfine	14.00	@32.00
Superfine	14.00	@32.00
Tub sized	10.00	@15.00
Engine sized	6.75	@11.00
Book, Cased—		
S. & S. C.	5.25	@ —
M. F.	5.00	@ —
Coated and Enamel	6.75	@10.25
Lithograph	7.25	@11.75
Tissues—Per Ream—		
White No. 1	.65	@ .70
Anti-Tarnish M. G. only	.65	@ .70
Colored	.70	@ .90
White No. 2	.55	@ .60
Kraft	.65	@ .70
Manila	.55	@ .60
Manila—		
No. 1 Jute	9.00	@ 9.25
No. 2 Jute	7.75	@ 8.50
No. 1 Wood	4.00	@ 5.25
No. 2 Wood	3.50	@ 4.00
Butchers	3.37½	@ —
Fibre Papers—		
No. 1 Fibre	4.25	@ 5.50
No. 2 Fibre	4.00	@ 4.75
Common Bogus	1.50	@ 3.00
Screenings	2.00	@ 3.00
Card Middles	4.00	@ 5.00
Glassine—		
Bleached, basis 25 lbs., No. 1	.09¼	@ —
No. 2	.11¼	@ —
Bleached, basis 20 lbs.	.11¼	@ —
(Delivered New York)		
News, per ton—		
Rolls, contract	57.00	@ —
Rolls, spot	57.00	@ —
Sheets	62.00	@ —
Side Runs	42.00	@46.00
Kraft—		
No. 1 Domestic	4.25	@ 5.30
No. 2 Domestic	3.75	@ 4.25
Southern	3.50	@ 4.00
Imported	6.00	@ 7.00
Boards—per ton—		
News	27.50	@30.00
Straw	40.00	@45.00
Chip	27.50	@30.00
Binders' Boards	65.00	@70.00
Standard 85 Test Liner	32.50	@35.00
Sgl. Mla. Lt. Chip	37.50	@42.50
(F. o. b. Mill)		
Wood Pulp Boards	70.00	@80.00

Mechanical Pulp

(On Dock)

No. 1 Imported—		
Moist	24.00	@28.00
Dry	26.00	@28.00
(F. o. b. Mill)		
No. 1 Domestic	25.00	@30.00

Chemical Pulp

(On Dock, Atlantic Ports)

Sulphite (Imported)—		
Bleached	2.50	@ 3.50
Easy Bleaching	2.15	@ 2.35
No. 1 strong unbleached	1.90	@ 2.25
Mitscherlich unbleached	2.00	@ 2.25
No. 2 strong unbleached	1.80	@ 2.00
No. 1 Kraft	1.50	@ 1.70
No. 2 Kraft	1.35	@ 1.50
Sulphate—		
Bleached	2.75	@ 3.25
(F. o. b. Pulp Mill)		
Sulphite (Domestic)—		
Bleached	2.25	@ 4.75
Easy Bleaching	2.50	@ 2.75
News	1.80	@ 2.50
Mitscherlich	2.40	@ 3.00
Kraft (Domestic)	1.60	@ 2.75
(Delivered Paper Mills)		
Soda Bleached	3.00	@ —

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	6.50	@ 7.00
New White, No. 2	5.50	@ 6.00
Silesias No. 1	5.25	@ 5.50
New Unbleached	7.00	@ 7.50
New Blue Prints	4.00	@ 4.50
New Soft Blacks	3.50	@ 4.00
Blue Overall	5.00	@ 5.25
Fancy	3.00	@ 3.50
Washables	2.75	@ 3.00
Mixed Khaki Cuttings	3.50	@ 4.00
Pink Corset Cuttings	5.00	@ 5.50
O. D. Khaki Cuttings	4.50	@ 4.75
Men's Corduroy	3.00	@ 3.50
New Mixed Blacks	3.00	@ 3.25

Old Rags

White, No. 1—		
Repacked	5.25	@ 5.75
Miscellaneous	4.25	@ 4.75
White, No. 2—		
Repacked	3.00	@ 3.50
Miscellaneous	2.30	@ 2.50
St. Soiled, White	1.50	@ 1.75
Thirds and Blues—		
Repacked	2.25	@ 2.50
Miscellaneous	1.65	@ 1.85
Black Stockings	3.25	@ 3.75
Roofing Rags—		
Cloth Strippings	1.25	@ 1.30
No. 1	1.25	@ 1.30
No. 2	.90	@ 1.00
No. 3	.70	@ .80
No. 4	.65	@ .70
No. 5A	.50	@ .60

Foreign Rags

New Rags

New Dark Cuttings	2.00	@ 2.15
New Mixed Cuttings	2.10	@ 2.40
New Light Silesias	5.00	@ 5.38
Light Flannelettes	5.00	@ 5.25
Unbleached Cuttings	6.75	@ 7.00
New White Cuttings	6.25	@ 6.50
New Light Oxfords	5.00	@ 5.50
New Light Prints	3.25	@ 3.50

Old Rags

No. 1 White Linens	6.50	@ 6.75
No. 2 White Linens	5.75	@ 5.25
No. 3 White Linens	4.00	@ 4.50
No. 4 White Linens	2.50	@ 3.00
No. 1 White Cotton	4.50	@ 5.00
No. 2 White Cotton	3.50	@ 4.25
No. 3 White Cotton	2.50	@ 3.25
No. 4 White Cotton	1.50	@ 1.75
Extra Light Prints	2.25	@ 2.50
Ord. Light Prints	2.00	@ 2.25
Med. Light Prints	1.55	@ 1.60
Dutch Blue Cottons	1.50	@ 1.60
French Blue Linens	2.40	@ 2.50
German Blue Linens	2.10	@ 2.20
German Blue Cottons	1.45	@ 1.50
Checks and Blues	1.40	@ 1.45
Lindsay Garments	.90	@ 1.00
Dark Cottons	.70	@ .75
Old Shopperies	.65	@ .70
New Shopperies	.60	@ .65
French Blues	1.40	@ 1.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	1.60	@ 1.75
Domestic	1.65	@ 1.80
Wool Tares, light	1.60	@ 1.75
Wool Tares, heavy	1.20	@ 1.25
Bright Bagging	1.20	@ 1.30
Small Mixed Rope	.90	@ 1.00
Manila Rope—		
Foreign	1.90	@ 2.00
Domestic	2.10	@ 2.2.
New Burlap Cut	1.80	@ 1.90
Hessian Jute Threads—		
Foreign	2.60	@ 2.75
Domestic	2.80	@ 3.00

Old Waste Papers

(F. o. b. New York)

Shavings—		
Hard, white, No. 1	2.65	@ 2.85
Hard, white, No. 2	2.15	@ 2.25
Soft, white, No. 1	2.15	@ 2.25
White envelope cuttings	2.60	@ 2.70
Flat Stock—		
tings	2.50	@ 2.60
Stitchless	.80	@ .90
Overissue Mag	.80	@ .90
Solid Flat Book	.65	@ .75
Crumpled No. 1	.55	@ .60
Solid Book Ledger	1.75	@ 1.85
Ledger Stock	.75	@ .80
New B. B. Chips	.20	@ .30
Manilas—		
New Env. Cut	1.75	@ 1.85
New Cuttings	1.50	@ 1.60
Extra No. 1 old	1.10	@ 1.25
Print	.45	@ .50
Bogus Wrapper	.45	@ .50
Container	.25	@ .30
Old Kraft Machine—		
Compressed bales	1.20	@ 1.30
News—		
No. 1 White News	1.55	@ 1.65
Strictly Overissue	.35	@ .45
Strictly Folded	.25	@ .30
No. 1 Mixed Paper	.20	@ .25
Common Paper		Nominal

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protects your rolls and insures their delivery to your customer in perfect condition. They eliminate claims for damages.

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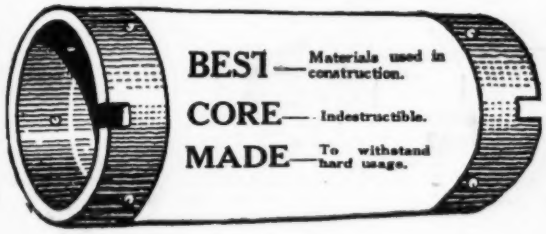

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HAMILTON, ONTARIO

Elixman Paper Core Company
CORINTH, N. Y.

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AGENTS

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MACHINE FINISHED BOOK
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PAPERS

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also

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503 Market St., San Francisco, Cal.
Sixth and Chestnut Sts., Philadelphia, Pa.

Twines

(F. o. b. Mill)

Cotton—			
B. C., 18 basis	.30	@	.32
No. 1	.20	@	.22
No. 2	.19	@	.20
No. 3	.17	@	.18
A. Italian, 18 basis	.36	@	.37
Finished Jute—			
Dark, 18 basis	.18	@	.20
Light, 18 basis	.20	@	.22
Jute Wrapping, 3-6 Ply—			
No. 1	.13	@	—
No. 2	.11	@	—
Tube Rope—			
4-ply and larger	.09	@	—
Fine Tube Rope—			
4-ply	.11	@	—
3-ply	.12	@	—
2-ply	.13	@	—
Paper Makers Twine Balls	.07	@	—
Box Twine, 2-3 ply	.07	@	.08
Jute Rope	.09	@	.10
Amer. Hemp, 6	.27	@	.29
Java Sisal—			
No. 1 Basis	.10	@	—
No. 2 Basis	.09	@	—
New Zealand Sisal	.10	@	—
Sisal Lath Yarn—			
No. 1	.12	@	.14
No. 2	.10	@	.12
Manila Twine	.21	@	.22

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.30	@	.53¼
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¼	@	.11
Superfine Writing	.18	@	.24
No. 1 Fine Writing	.14	@	.18
No. 2 Fine Writing	.12	@	.14
No. 3 Fine Writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¼	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.04	@	.04½
No. 1 Kraft	5.00	@	5.50
Southern Kraft	3.75	@	4.00
No. 2 Kraft	3.75	@	4.00
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¾
Manila Tissue	.07	@	.07½
White Tissue	.07¼	@	.07½
(Delivered Central Territory)			
News, per ton—			
Rolls, contract	62.00	@	—
Sheets	67.00	@	—
Boards, per ton—			
Plain Chip	30.00	@	35.00
Solid News	32.50	@	37.50
Manila Lined Chip	40.00	@	45.00
Container Lined—			
85 Test	50.00	@	55.00
100 Test	55.00	@	60.00

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	2.35	@	2.40
White Env. Cuttings	—	@	—
No. 1 Soft Shavings	2.10	@	2.15
Ledger & Writings	.70	@	.75
Solid Books	.75	@	.80
Blanks	1.60	@	1.65
Krafts	1.25	@	1.35
New Kraft Cuts	1.35	@	1.45
Manila Env. Cuts	1.50	@	1.55
Ex. No. 1 Manila	1.25	@	1.30
Print Manila	.40	@	.45
Overissue News	.40	@	.45
Old Newspapers—			
No. 1	.35	@	.40
No. 2	.30	@	.35
Mixed Papers—			
No. 1	.28	@	.30
No. 2	.20	@	.25
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

(F. o. b. Mill)

Bonds	.05	@	.40
Ledgers	.07	@	.40
Writings—			
Superfine	.12	@	.18
Extra fine	.16	@	.22
Fine	.15	@	.26
Fine, No. 2	.13½	@	.25
Fine, No. 3	.08½	@	.20
Book, M. F.	.05	@	.07
Book, S. S. & C.	.05	@	.07½
Book, Coated	.08	@	.16
Coated Lithograph	.07	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.07	@	.09
Manila Sul., No. 1	.03¼	@	.05½
Manila No. 2	.03	@	.04
No. 1 Kraft	.05¼	@	.06
No. 2 Kraft	.03¾	@	.04¼
Southern Kraft No. 1	—	@	.03¾
Southern Kraft No. 2	—	@	.03¾
Common Bogus	.03	@	.04
(Delivered Philadelphia)			
News Print Rolls	58.00	@	62.00
Straw Board	50.00	@	—
News Board	29.00	@	30.00
Chip Board	27.50	@	—
Wood Pulp Board	85.00	@	95.00
Binder Boards—			
No. 1, per ton	75.00	@	—
No. 2, per ton	68.00	@	—
Carload lots	66.00	@	70.00
Tarred Felts—			
Regular	55.50	@	57.00
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.06	@	.07
New White, No. 2.	.05½	@	.06
Light Silesias	.05	@	.05½
Silesias, No. 1	.06	@	.08
Black Silesias, soft.	.05	@	—
New Unbleached	.06½	@	.07
Washable, No. 1	.03	@	.03½
Blue Overall	.05	@	.05½
Cottons—According to grades—			
Washable, No. 2	.02	@	.02½
New Blue	.02	@	.02½
Fancy	.03½	@	—
New Black Soft	.03	@	.03½
New Light Seconds	.01¾	@	.02
New Dark Seconds	1.85	@	2.00
Khaki Cuttings—			
No. 1 O. D.	.04½	@	.05
No. 2 Mixed	.03½	@	.04
Corduroy	.02½	@	.03
New Canvas	.06½	@	.07
New Black Mixed.	.03	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.50	@	3.00
M. G.	4.50	@	—
Thirds and Blues—			
Miscellaneous	1.25	@	1.50
Repacked	1.75	@	2.00
Black Stockings (Export)	3.80	@	4.00
Roofing Stock—			
Foreign No. 1	1.15	@	1.25
Repacked	.80	@	.90

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.50	@	1.60
Domestic	1.75	@	—
Manila Rope	2.50	@	2.75
Sisal Rope	1.25	@	1.50
Mixed Rope	1.10	@	1.25
Scrap Burlaps—			
No. 1	1.50	@	1.60
No. 2	1.10	@	1.20
Wool Tares, heavy	3.00	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.50	@	2.75
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White.	2.30	@	2.35
No. 2 Hard White.	2.00	@	2.05
No. 1 Soft White.	1.75	@	1.85
No. 2 Soft White.	1.30	@	1.45
No. 1 Mixed.	.75	@	.80
No. 2 Mixed.	.50	@	.55
Solid Ledger Stock.	1.25	@	1.30
Writing Paper.	.70	@	.80
No. 1 Books, heavy.	.75	@	.80
No. 2 Books, light.	Normal		
No. 1 New Manila.	1.60	@	1.75
No. 1 Old Manila.	1.25	@	1.30
Print Manila	.40	@	.50
Container Manila	.40	@	.45
Old Kraft	.90	@	1.05
Common Paper	.20	@	.25
No. 1 Mixed Paper.	.25	@	.30
Straw Board, Chip.	.35	@	.40
Binders Board, Chip.	.35	@	.45
Corrugated Board	.40	@	.45
Overissue News.	.35	@	.40
Old Newspaper	.25	@	.30

BOSTON

Paper

(F. o. b. Mill)

Ledgers—			
Sulphite	.07½	@	.12½
Rag Content	.15	@	.30
All Rag	.38	@	.52½
Bonds—			
Sulphite	.06½	@	.11½
Rag content	.15	@	.30
All rag	.36½	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04½	@	.05½
No. 2 Kraft	.03¾	@	.04½
(F. o. b. Boston)			
Southern Kraft	.03½	@	.03¾
(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)			
Common Bogus	.02	@	.02¼
(Delivered New England points)			
News Print, rolls	—	@	56.50
Straw Board, rolls.009	—	@	52.50
Straw Board in Sheets, basis 35s to 70s	—	@	50.00
Filled News Board	27.50	@	30.00
Chip Board	27.50	@	—
Chip Board (Creasing)	27.50	@	30.00
Single Manila Lined Chip	40.00	@	45.00
Single White, Patent Coated News Board—Binder	52.50	@	60.00
Wood Pulp Board	70.00	@	75.00
Binder Boards	67.50	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	3.25	@	3.75
No. 2 Hard White	2.50	@	2.60
No. 1 Soft White	2.25	@	2.40
No. 2 Mixed	.60	@	.65
No. 1 Mixed	.90	@	1.00
Solid Ledger Books	1.75	@	2.00
Overissue Ledger Stock	1.35	@	1.60
Mixed Ledgers	1.15	@	1.30
No. 1 Books, heavy	.75	@	.90
No. 1 Books, light	—	@	.45
Crumpled Stitchless Book Stock	1.00	@	1.25
Manila Env. Cuttings	1.85	@	2.00
No. 1 Old Manila	—	@	1.00
White Blank News	1.50	@	1.60
Kraft No. 1	—	@	1.15
Manila	.80	@	.90
No. 1 Mixed Paper	—	@	.16
Print Manila	.35	@	.40
Overissue News	—	@	.40
Old Newspapers	.25	@	.30
Box Board, Chip	.16	@	.20
Corrugated Boxes	.35	@	.45

Bagging

(F. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.80
Domestic	1.50	@	1.60
Manila Rope—			
Foreign	—	@	1.75
Domestic	—	@	2.00
Transmission Rope	1.40	@	1.50
Mixed String	.50	@	.55
Jute Rope	1.00	@	1.15
Jute Carpet Threads	.75	@	.90
Bleachery Burlap	2.50	@	2.75
No. 1 Scrap Burlap	1.10	@	1.25
Scrap Sisal	1.35	@	1.45
Scrap Sisal for shredding	1.50	@	1.60
Wool Tares, heavy	1.25	@	1.30
New Burlap Cutting	1.50	@	1.25
Australian Pouches	2.00	@	2.25
Heavy Baling Bagging	1.50	@	1.60
Paper Mill Bagging	.90	@	1.05
Bagging No. 2	.50	@	—
No. 1 Burlap	—	@	3.50

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New White No. 1.	.06½	@	.07
New White No. 2.	—	@	.06
Silesias No. 1	.06	@	.06½
New Black Silesias	.02½	@	.02¾
New Unbleached	—	@	.08
Fancy	.04	@	.04½
Washable	.04	@	.04½
Cottons—According to grades—			
Blue Overalls	.05	@	.06
New Black, soft	.04	@	.04¼
Khaki Cuttings	.04	@	.04½
O. D. Khaki	.04½	@	.05
Corduroy	.03	@	.03½
New Canvas	.08	@	.08½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	4.75	@	5.25
Miscellaneous	—	@	4.00
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Twos and Blues	2.50	@	2.75
Thirds and Blues—			
Repacked	1.60	@	1.80
Miscellaneous	1.00	@	1.20
Black Stockings	3.25	@	3.50
Roofing Stock—			
No. 1	—	@	.63
No. 2	—	@	.58
No. 3	—	@	.53

Foreign Rags

(F. o. b. Boston)

Dark Cottons	—	@	.70
New No. 1 White Shirt Cuttings	6.50	@	6.75
Dutch Blues	—	@	1.80
New Checks & Blues	4.00	@	4.50
Old Fustians	1.55	@	1.65
Old Linsey Garments	.80	@	.90

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.10¾	@	—
No. 2 Sulphite	08½	@	—
No. 1 Colored	.11¼	@	—
No. 2 Colored	.09	@	.10½
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
Book—			
No. 1 M. F. (carloads)	6.65	@	—
No. 3 M. F. (carloads)	6.20	@	—
No. 1 S. C. (carloads)	7.15	@	—
No. 3 S. C. (carloads)	6.65	@	—
No. 4 S. C. (carloads)	5.70	@	—
No. 1 Coated and Litho	12.50	@	—
No. 2 Coated and Litho	11.50	@	—
No. 3 Coated and Litho	10.00	@	11.50
Coated tinted	14.00	@	—
Wrapping—			
Rag Brown	4.95	@	—
White Wrap	5.25	@	—
"B" Manila	5.00	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft No. 2	5.40	@	—

(Delivered Toronto)

News, per ton—			
Rolls (contract)	61.50	@	62.00
Sheets	67.00	@	—

Pulp

(F. o. b. Mill)

Ground Wood	30.00	@	32.00
Sulphite easy bleaching	50.00	@	—
Sulphite, news grade	50.00	@	—
Sulphite, bleached	62.50	@	75.00
Sulphate	60.00	@	—

Old Waste Paper

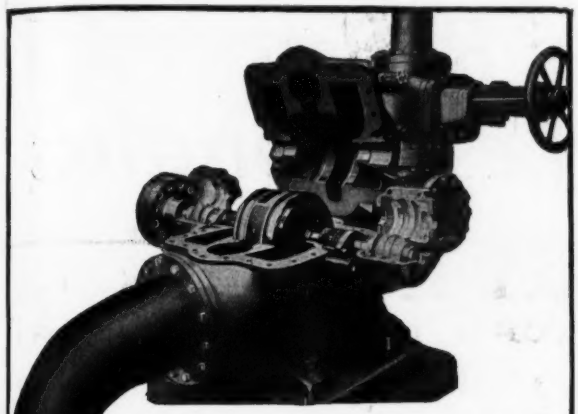
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.80	@	—
Soft White	2.60	@	—
White Blk. News	1.50	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.10	@	—
Light and Crumpled Book Stock	1.20	@	—
Ledgers and Writings	—	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	.80	@	—
Kraft	1.90	@	—
News and Scrap—			
Strictly Overissue	.70	@	—
Strictly Folded	.70	@	—
No. 1 Mixed Paper	.60	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.09½	@	.10
Fancy Shirt Cuttings	.06	@	.06¼



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Sulphuric and Nitric Acids

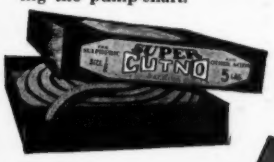
is overcome by using

SUPER CUTNO PACKING

—the result of careful experiments to produce a packing that will resist the very destructive element of these acids, especially at elevated temperatures.

SUPER-CUTNO will give longer and more economical service under the very difficult conditions of these acids than any other packing designed for the same purpose.

The lubricant of **SUPER-CUTNO** is so compounded as to resist as far as possible the cutting tendency of these acids and is retained in the packing as long as possible in order to prevent the packing from hardening and scoring the pump-shaft.



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NEW YORK

SULPHURIC ACID

PAPER TRADE JOURNAL

ESTABLISHED 1872

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

SIXTIETH YEAR

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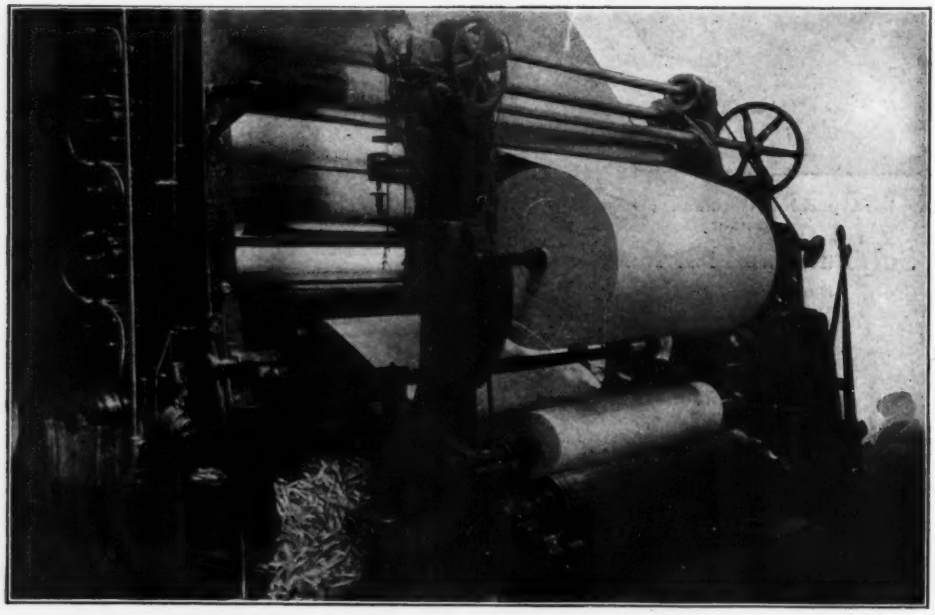
Want and For Sale Advertisements, 61-62-63

Wrinkless Rolls
More Speed — Less Vibration



Two-Drum Type (Photograph taken in a Kimberly-Clark Mill)

"M & W"
Super-Calender Winders

- **Rolls trimmed direct from Super-Calenders —(retrimming unnecessary).**
- **Rolls readily changed from winding drums to unwinding shaft by means of self-contained electric motor lift.**
- **Straight, hard rolls without wrinkles . . . no soft rolls or telescoped ends.**
- **Equipped with automatic tension regulation to prevent paper breaking between calender and winder . . . and to regulate hardness of rolls wound.**
- **For wide stacks of Calenders, the "M & W" Four-Drum Super-Calender Winder reduces waste of finished product.**
- **All features of "M & W" Four-Drum Winder used for making shipping rolls direct on paper machine are retained independent winding of rolls on independent shafts, etc.**

Shipping Rolls made direct from Supers without rewinding

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PAPER MILL MACHINERY